Critical Success Factors for Original and Derivative Ventures and SMEs

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Christian Soost

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Finis coronat opus.

Publius Ovidius Naso

(43 BC – AD 17)

Contents

List of Abbreviations

AVE Average variance extracted

CEOs Chief executive officers

CSF Critical success factor

CSFs Critical success factors

DIW German Institute for Economic Research

HRM Human resource management

IMO Input-mediator-outcome framework

IPO Input-process-outcome framework

OLS Ordinary least squares

PFIP Pay for individual performance

PFP Pay for performance

PLS Partial least squares

R&D Research and development

SEM Structural equation modeling

SME Small and medium-sized enterprise

SMEs Small and medium-sized enterprises

SOEP German social-economic panel study

US United States

VAT Value-added tax

VC Venture capital

VIF Variance inflation factor

Directory of Important Symbols

ξ_j Latent variable

x_{jh} Measured item of the latent variable ξ_j

λ_{jh} Loading of the measured item of the latent variable ξ_j

ϵ_{jh} Error term of the λ_{jh} for a reflective measured latent variable ξ_j

π_{jh} Weight of the measured item of the latent variable ξ_j

σ_j Error term of the π_{jh} for a formative measured latent variable ξ_j

β_{ji} Path coefficient from ξ_i to ξ_j (also called structural model parameter)

υ_j Error term of the latent variable ξ_j in the structural model

Z_j Inner estimation for the latent variable ξ_j

Y_j Outer estimation for the latent variable ξ_j

e_{ji} Weight for the path between ξ_i and ξ_i for the inner estimation

φ_j, f_j Standardization factors of the latent variables ξ_j

$h = 1, \cdots, H_j$ Index of the measured items of the latent variables ξ_j

$X_j = (x_{j1} \ \cdots \ x_{jH_j})$ Matrix of the measured variables of the latent variables

f^2 Effect intensity

Q^2 Stone-Geisser's Q^2 evaluates the forecast relevance of the dependent variables in the structural model

α Cronbach's α

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Chapter 1

Introduction

1.1 The Research Framework

The research on success factors that affect organizational performance has engaged academics for a long time.[1] Since the publication of an article by Rockart (1979) scholars try to identify success factors for organizational performance or even more specifically: Critical Success Factors (CSFs). In his article from 1979, Rockart only describes CSFs for individual cases by interviewing CEOs (chief executive officers) of different organizations. His approach was of qualitative nature and aimed at the individual (personal) level. After this initial and pathbreaking work scholars started to identify CSFs with a wider variety of applicability to get best practices for entire industry sectors or organizations in general. In other words, the research for CSFs changed from the individual level to a kind of a meta level discourse that still continues (e.g. Daft and Dalton (1990)).[2] All those studies

[1] The first article concerning success factors was written by the McKinsey consultant Daniel D. Ronald in 1961 (Daniel (1961)).

[2] The Pittsburgh Conference in 1977 stated the goal to identify general rules that affect performance and can be seen as the scientific legitimation for research on CSFs (Schendel and Hofer (1979)).

concerning CSFs jointly have organizational performance[3] as a dependent variable. Along with this, research on CSFs is an integral part of management sciences, organization theory and operation research and also plays a great role for entrepreneurship and SME (small and medium-sized enterprise) research. Taking into account the relatively high failure rate of start-ups (e.g. Schneck and May-Strobl (2014), van Praag (2003)) and the liability of smallness and newness (Hannan and Freeman (1984), Stinchcombe (1965)) the identification of CSFs and their consideration could be existential for the growth and survival of start-ups and SMEs. CSF research represents a highly output-oriented discipline and thus conforms with the objectives of this thesis. In the view of the broad field of CSF research the focus lies on research that pursues the goal to provide practical and policy relevant results.

The success factor research identified a large quantity of factors in the area of entrepreneurship and (strategic) SME management that could enhance organizational performance. To structure their vast quantity Szyperski and Nathusius (1977) (see also Brüderl et al. (1992), Klandt (1984)) divide success factors as follows: Personal-related success factors, company-related success factors, and context-related success factors. This so-called three-factor-model can be understood primarily as guidance or heuristic approach to make success research tangible (Preisendörfer (2002)) and is used until now for classification.

Additionally, there exist different explanatory approaches that try to explain organizational performance. These are e.g. the human capital theory, social capital theory, the network approach, the organizational ecology approach, and the industrial economic approach. Human capital, social capital, and the network are included as success factors in the three-factor-model as well as important outcomes

[3] The concept of organizational performance describes the association of productive assets, human, physical, and capital resources to create value (Carton (2004), Jensen and Meckling (1976), Simon (1976), Barney (2010)). This value creation can be measured in different ways depending on the individual classification of value. This could be e.g. financial or nonfinancial. A detailed discussion can be looked up in chapter 2.

of the organizational ecology and industrial economic approach. Table 1.1 shows the three-factor-model of success with the most important success factors for each category. The following paragraphs give an overview on important research results mainly for new venture firms.

Category		**Success Factors**
Personal-related success factors	$\Rightarrow$	Personality traits Demographic characteristics Human capital Social capital
Company-related success factors	$\Rightarrow$	Imprinting factors Network Foundation structure Strategic management/orientation
Context-related success factors	$\Rightarrow$	Environment Industrial sector characteristics Social and macroeconomic conditions

Table 1.1. *Three-Factor-Model of Success*

Personal-related success factors explain organizational performance by the founders personality, demographic characteristics, human capital, and social capital. These success factors base on the assumption that business owners and entrepreneurs still play an important role for organizational success. The research on the founders personality concentrates on the identification of personality traits that are typical for entrepreneurs. Table 1.2 shows important empirical research results concerning demographic characteristics and personality traits. The effects of demographic characteristics, however, seem to be contradictory. Additionally, the gender discourse shows the necessity of further research due to inconsistent results.

Concerning the personality traits the results are clearer whereby the quantity of performance relevant personality traits seems to be enormous. The high quantity of relevant traits offers scope for criticism and until now "no one, all-encompassing entrepreneurial profile exists" (Kao (1991), page 13.). Thus, the empirical results indicate that it is impossible to find the universal valid trait recipe that leads to organizational performance.

The level of education, experience, knowledge, as well as the skills of individuals determine the concept of human capital (Becker (1964), Mincer (1958)) whereby it is seen as an important personal-related success factor (e.g. Pfeffer (1994), Sexton and Upton (1985)).[4] It thus seems reasonable that the individuals capabilities are essential to discover and exploit business opportunities (Shane and Venkataraman (2000), Shane (2000)), help to acquire financial and physical capital (Chandler and Hanks (1998)), and provide the capability for further learning (Hunter (1986), Unger et al. (2011)). The representative research results in table 1.3 show an empirically verified impact of human capital on performance. The meta-analytic review of Unger et al. (2011) e.g. has analyzed over 30 years of human capital research in entrepreneurship and reveals that there exists an overall positive relationship of human capital with entrepreneurial success even though this relationship is rather small.

The concept of social capital[5] describes that knowing others or better, maintaining a personal network could simplify the access to resources (e.g. Nahapiet and Ghoshal (1998)). Obviously, a network is based on social relations that provide benefits due to an information exchange characterized by cooperation and trust (Fukuyama (1995)).

[4] An excellent and extensive overview about the relationship of human capital and success is given by Moog (2004).

[5] The term social capital is known since 1890 and became widely used in the late 1990s not least on the basis of different mainstream books (e.g. Putnam (2001), Putnam and Feldstein (2004)) that took up this concept. For a detailed analysis see e.g. Adler and Kwon (2002) that provide an excellent overview about the definitions of social capital.

Success Factor	Study	Performance Measure	Key Findings
Demographic characteristics	Brockhaus (1980)	Survival	Successful entrepreneurs are less satisfied with their previous jobs, more fearful of dismissal from their previous jobs, younger, and married.
	Bosma et al. (2004)	Survival, profits, employment	Entrepreneurs' age has no effect on performance.
	Klandt (1984)	Survival, employment, sales, earnings, satisfaction	Parental education, age, gender do not influence success.
	Delmar and Gunnarsson (2000), Birley (2002)	First sales, cashflow, entrepreneurial capital,	Self-employed parents influence the entrepreneurial orientation positively, they do not influence the likelihood of success.
	Kalleberg and Leicht (1991), Du Rietz and Henrekson (2000) , Robb and Watson (2011)	ROA, Business failure, earnings growth, sales, profitability, employment, orders	Female headed businesses are not less successful than those owned by men.
	Fischer (1992)	Size, income, sales, growth	Women's firms have lesser performance than men's primarily in terms of size and growth.
	Rosa et al. (1996)	Employment, growth in employment, sales turnover, value of capital assets	Female businesses underperform in number of employees, VAT registration, sales turnover, capital assets and range of markets.
	Carter et al. (2007), Carter and Rosa (1998)	Venture capital, supplier credit, diverse criteria concerning bank loans	Women are discriminated in business financing.
Personality traits	Rauch and Frese (2000)*, Rauch and Frese (2007a)*	Diverse financial measures	Broad personality traits (extraversion, emotional stability, openess to experience, agreeableness, conscientiousness) and specific personality traits (need for achievement, risk-taking, innovativeness, autonomy, locus of control, self-efficacy) influence success positively.
	Jacobsen (2006)	Diverse success measures	This book reviews high endurance level, growth orientation, leadership, creativity, alertness, decisiveness, flexibility, cope with change, commitment, proactive personality as important success drivers.
	Rauch and Frese (2007b)*	Diverse success measures	Specific personality traits influence performance stronger than broad personality traits.
	Zhao et al. (2010)*	Diverse success measures	The big five personality dimensions are associated with performance.

Meta-studies are marked with *

Table 1.2. *Personal-Related Success Factors I*

These social relations can be distinguished between relations of an actor with other actors (external ties), relations with actors inside a collectivity (internal ties) and a mixture of both. In order to ensure that these network ties influence organizational performance social capital has to be converted into economic capital, which is quite challenging (Adler and Kwon (2002)). Therefore, the question arises if social capital could be analyzed as capital. Baron and Hannan (1994) and Adler and Kwon (2002) answer this question with their statement that social capital has to be understood metaphorically as capital in the context of personal relationships and their benefits.

The company-related success factors involve organizational imprinting factors, and the firm's network, the foundation structure and strategic management/ orientation as success factors. The organizational imprinting hypothesis articulated by Stinchcombe (1965) describes initial founding conditions and decisions and their impact on performance and especially on the hole lifetime of the organization.[6] Pennings (1980) formulates it on page 135 as follows: "The creation of a new organization is one of the most salient moments of its life cycle. Organizational birth is salient not only because it is the starting point of that life cycle, but also because it is an overriding factor in molding and constraining the organization's behavior during its subsequent stages of the life cycle."

Regarding the literature shows that resources and especially financial resources represent the most important imprinting factor (e.g. Bamford et al. (1999)). A further issue in the context of imprinting factors is the foundation structure (new venture formation vs. business succession and individual foundation vs. team foundation) (e.g. Preisendörfer (2002)). This research stream analyses the determinants of entrepreneurial choice and especially focuses individual vs. team foundation.

[6] For further information look at Marquis and Tilcsik (2013).

Success Factor	Study	Performance Measure	Key Findings
Human capital	Cooper et al. (1994)	Failure, marginal survival, high growth	General human capital influences survival and growth, management know-how variables have less impact. Industry-specific know how contributes to survival and growth.
	Davidsson and Honig (2003)	First sales, profitability	Formal education and previous start-up experience enhance entry into nascent entrepreneurship, no impact on success.
	Brüderl et al. (1992)	Business survival	Years of schooling, work and industry-specific experience have strong direct and indirect effects on survival.
	Moog (2004)	Sales growth, employee growth	Formal and informal human capital have a positive impact on performance.
.	Rauch et al. (2005)	Employment growth	Human capital of business owners and employees, and human resource development and utilization are important factors predicting growth of small-scale enterprises.
	Bosma et al. (2004)	Survival, profits, employment	Former industry experience and leadership experience enhance performance.
	Unger et al. (2011)*	Size, growth and profitability measures	Positive relationship of human capital and success. Outcomes of human capital investments (knowledge/skills) were higher than for human capital investments (education/experience). Human capital with high task-relatedness is more important compared to low task-relatedness.
	Martin et al. (2013)*	Financial success measures	Entrepreneurship education and training has a positive impact on performance.
Social capital	Florin et al. (2003)	Financial capital, sales growth, return on sales	Social capital leverages the productivity of a venture's resource base and provides the venture with a durable source of competitive advantage.
	Baron and Markman (2003)	Average income, company revenues	Social capital assists entrepreneurs in gaining access to persons important for their success. Social skills can lead to higher social capital and success.
	Brüderl and Preisendörfer (1998)	Survival, employment growth, sales growth	Network support increases the probability of survival and growth for newly founded businesses.
	Westlund and Adam (2010)*	Diverse performance measures	There is strong evidence of the impact of social capital on firms' performance.
	Stam et al. (2014)*	Diverse performance measures	Positive and significant link of social capital and small firm performance.

Meta-studies are marked with *

Table 1.3. *Personal-Related Success Factors II*

Important research results concerning imprinting factors and the team foundation are shown in table 1.4 for the imprinting factors and table 1.5 for team effects. The results show that imprinting factors are of high relevance for organizational performance and that team foundations are more successful than individual foundations.

The economic ecology approach highlights the necessity of a fit between business strategy and the organizational environment.[7] This approach primarily investigates mortality rates and analyzes evolutionary processes over a long time period. Following Brüderl et al. (1992), organizational ecology can be understood as "background framework to derive hypotheses regarding the determinants of the survival chances of new businesses." (Brüderl et al. (1992), page 230). Thus, organizational ecology is a kind of macro level analysis that neglects the impact of the entrepreneur and business owner on organizational performance. A sample of research results regarding strategic management/ orientation and findings from economic ecology research are presented in table 1.4. It can be quickly realized that strategic management/ orientation is highly relevant for organizational performance. A further relevant company-related success factor is the firm's network. As for individuals, firm networks have positive effects on performance (see table 1.5).

[7] Economic ecologist identified useful recommendations concerning the strategic orientation and organizational performance. The most famous theory is given by Freeman and Hannan (1983) that developed a niche model that shows that generalists as well as specialists could be successful depending of the underlying context. The resource partitioning model by Carroll (1987) indicates that specialists could be successful if they enter into markets that are occupied mainly by generalists. In this case the specialist could benefit from not exhausted resources. Another important finding is the resource dependence model by Pfeffer and Salancik (1978). This model shows that the mortality rate of start ups is initially high in new emerging markets due to legitimation problems, then decreases until it rises again because of an increased competition on the market. This U-shape relationship changes to a reverse-U-shape relationship analyzing the founding rate.

Success Factor	Study	Performance Measure	Key Findings
Imprinting factors	Robinson and McDougall (2001)	Profitability, shareholder wealth creation, sales growth	Limited support that entry barriers like financial resources influence firm performance.
	Bamford et al. (1999)	Venture profitability, venture growth	Initial founding decisions and conditions are significantly related to growth potential.
	Cooper et al. (1994)	Failure, marginal survival, high growth	Capital enhances performance and makes it possible to buy time, undertake more ambitious strategies, change courses of action.
	Geroski et al. (2010)	Survival rate	Founding conditions contribute significantly to explain the variation in survival rates.
	Duchesneau and Gartner (1990)	Market share, financial return	Successful firms were initiated with ambitious goals with a clear broad business idea with broad planning efforts.
	Heirman and Clarysse (2005)	Revenues, employment, total assets	Raising VC is a key driver for success. Internationally oriented start-ups grow faster.
Strategic management/ orientation	Chandler and Hanks (1994)	Growth in market share, change in cash flow, sales growth, sales, earnings, net worth	The right fit of resources and competitive strategies determines success.
	Brüderl et al. (1992)	Business survival	Organizational strategies influence survival. Lower levels of capitalization leads to higher failure rates.
	Brinckmann et al. (2008)*	Primarily growth measures	Planning and contextual factors are beneficial for performance.
	Boyd (1991)*	Diverse performance measures	Modest correlation between planning and performance.
	Gibson and Cassar (2005)	Sales growth and employment growth	There exist a positive relationship between strategic planning and performance and should be introduced after a period of high growth.
	French et al. (2004)	Diverse growth measures	No significant relationship between performance and strategic planning. Net profit and informal planning are positive related.
	Sandberg and Hofer (1987)	ROE	Initial strategies affect performance.
	Delmar and Shane (2003)	Venture disbanding, product development, venture organizing activity	Business planning reduces the likelihood of venture disbanding and accelerates product development as well as venture organizing activity.

Meta-studies are marked with *

Table 1.4. *Company-Related Success Factors*

Success Factor	Study	Performance Measure	Key Findings
Network	Walter et al. (2006)	Sales growth, sales per employee, profit attainment	Network capabilities have positive effects on performance.
	Lee et al. (2001)	Sales growth	External networks are positive linked to venture capital that enhances performance.
	Lechner and Dowling (2003)	Firm growth	Firm networks lead to organizational growth.
	Gronum et al. (2012)	Innovation breadth, firm efficiency and effectivity	Positive impact of networks on firm performance mediated by innovation.
	Uzzi (1996)	Survival rate	Firms organized in networks have higher survival chances.
	Lee et al. (2001)	Sales growth	Only the linkage of external networks to venture capitalists enhances new venture performance.
Team	Timmons and Spinelli (2009)	Longevity, profitability	Team ventures perform better than solo entrepreneurs.
	Lechler (2001)	Growth rates of sales per year, ROI, and employment	Entrepreneurial teams play a vital role for success.
	Bell (2007)*	Diverse team performance measures	General mental ability, emotional intelligence, agreeableness, conscientiousness, openness to experience, collectivism, preference for teamwork are strong predictors for team performance.
Context-related success factors	Zahra (1993)	Venturing, innovation, and self-renewal activities, return on sales, sales growth	The environment has a deep impact on performance.
	Venkatraman and Prescott (1990)	ROI	There exist a positive performance impact of environment-strategy coalignment.
	Pelham and Wilson (1996)	Product quality and success, growth, profitability	Weak causal relationships between market environment, small-firm structure, and small-firm strategy and performance but strong and consistent influence of market orientation.
	Short et al. (2009)	Sales, sales growth, survival	Industry level matters little for the survival, industry membership matters less for sales and sales growth of new ventures.
	Baum et al. (2001)	Growth rates	The environment has significant indirect effects on firm performance.

Meta-studies are marked with *

Table 1.5. *Company- and Context-Related Success Factors*

Finally, context-related success factors include all environmental factors that could influence performance. In the three-factor-model (table 1.1) three dimensions characterize the environmental factors (e.g. Preisendörfer (2002)). First of all, the closer environment of the firm is seen as performance relevant. A common example can be the location dependency of organizations that can be a limitation and a success factor at the same time. The next dimension concerns industrial sector characteristics like innovation rates, the intensity of competition or profit margins. Finally, the superior dimension are social and macroeconomic conditions like the general economic situation or the taxation system that can have wide-ranging consequences for organizational performance. Thus, context-related success factors are deeply related to performance and therefore must also be taken into consideration for evaluating performance correctly.

The above presented overview on success factor research reveals the multidimensionality of this research area. On the one hand, there exist different approaches to measure success and performance that makes it difficult to compare the empirical results and, on the other hand, it can be shown that a huge amount of research does not pay attention to context-related success factors that could lead to diverse biases. A further aspect are contradictory results that raise the question whether this kind of research is able to deliver useful insights and practical implications.

This thesis develops a research framework that provides a better classification of the research on success factors. It is based on the three-factor-model and differentiates between overall success factors and specific success factors. Figure 1.1 shows the research framework and the success factors that are to be analyzed. The three-factor-model and research results from this framework are determined here as fundamental for the success of any individual and organization. They are mostly independent of the underlying context and the stage of growth and constitute the basement of the framework. The overall success factors are divided into personal-related suc-

cess factors, company-related success factors, and context-related success factors as presented on the previous pages.

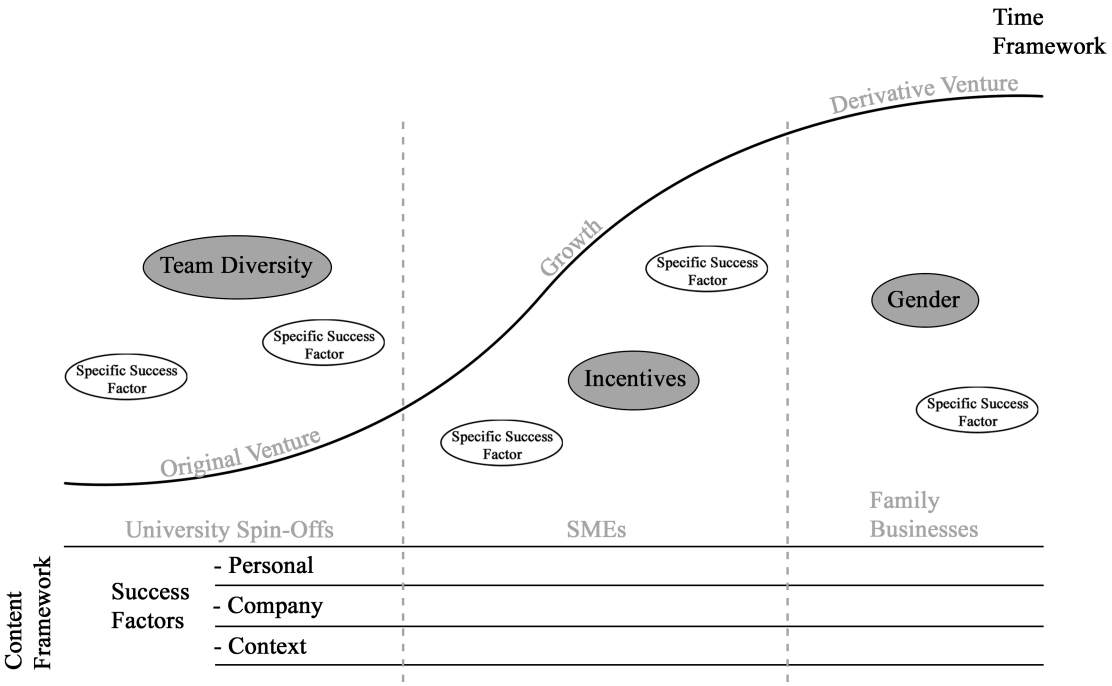

Figure 1.1. *Research Framework*

The specific success factors are represented by ellipses and sorted in different life-cycle stages of the firm and the corresponding contexts (university spin-offs, SMEs, and family businesses). They represent success factors that are particularly effective or of high importance in the mentioned life-cycle stage for the different organizational types. The division in three major life-cycle stages is oriented at the three-stage life-cycle model of Smith et al. (1985) and can be extended as required.[8] These stages describe unique situations in the life-cycle of the firm that require a specific analysis that shifts the focus away from usual success factors to specific ones. The life-cycle stages mentioned in this framework are the new venture formation, the process of growth, and the internal or external business succession. This thesis focuses one

[8] Life-cycle concepts are noted since Davis (1951) and try to illustrate the evolution of organizations as known initially from biology. A good overview about current lify-cycle concepts is given by Hanks et al. (1994).

success factor for each life-cycle stage in this framework. These success factors are **team diversity**, **incentives**, and **gender**.

The criteria for the selection of these specific success factors can be split into a scientific and practice dimension. On the one hand there do exist several research gaps regarding the effects of team diversity, incentives, and gender in the special life-cycle stages that should be closed and on the other hand the research on these success factors is of high practical relevance for the organizations observed. Additionally, the results shall provide important policy relevant implications. The following paragraphs explain the selection criteria for each success factor in detail and offer a first glimpse into the different research studies that are introduced extensively in the following section 1.2.

The first stage in the life-cycle describes the new venture formation. At this stage, the specific success factor **team diversity** is seen as important driver for success as building the team is a first and relatively easy possibility to affect performance and can have wide-ranged consequences for the future performance of the venture (e.g. Carland and Carland (2012)). Thus, the question arises if teams should be composed more homogeneously or rather heterogeneously to be successful. The research on team diversity is done here with a sample of university spin-offs located in the high-technology sector. These spin-offs are mostly founded by teams (e.g. Helm and Mauroner (2007)) and are of high macroeconomic importance (Shane (2004), Breznitz et al. (2008)) and therefore are selected in this thesis. Regarding the scientific dimension the research on team effectiveness in entrepreneurship has dramatically risen in the last two decades (e.g. Cohen and Bailey (1997), Mathieu et al. (2008), Klotz et al. (2014)), but the question how team diversity affects organizational performance is still unanswered. A sophisticated mediating model is used in this thesis to study the effects of team diversity in detail for new ventures and to answer the question if team diversity really matters.

The use of **Incentives** as a human resource management instrument represents a substantial specific success factor in the life-cycle stage that is mainly characterized by firm growth. At this stage, the new venture changes from a small start-up to a structured organization with a rising quantity of employees.[9] Human resource management and especially the use of compensation strategies can be a strong success factor (e.g. Milkovich et al. (2011)) but also includes the risk of negative effects (e.g. Frey and Osterloh (2002)). Therefore, their application could be a double-edged sword that leads to the question which incentives are the most appropriate to enhance performance. The answer to this question is given in this thesis for the use of financial and nonfinancial incentives in SMEs. Up to date their exist only a few research results concerning this topic for SMEs (e.g. the studies of Behrends (2007) and Behrends and Martin (2006)) so that the empirical results given here can help to close this research gap. Furthermore, the use of the "right" incentives is of high practical relevance for SMEs regarding the war of talents and, therefore, the competitiveness of the firm. Additionally, this research project has a unique value for the case of Germany. A negative consequence of the demographic change in Germany concerns a shortage of talent for SMEs (Kay (2012), Kay and Richter (2010)) that could have dramatic effects for the economy in general and SMEs in particular (Gude et al. (2010)). This shortage of talent can be solved by using adequate incentives to maintain or recruit high skilled employees.

In contrast to usual life-cycle constructs the final stage in the life-cycle used in this work describes the business succession.[10] In this life-cycle stage **gender** is emphasized as success factor. The successful business succession is crucial for a long-term existence of the organization especially for family firms (Lee et al. (2003)). A critical factor concerning the business take-over is the selection of the appropriate

[9] For a detailed analysis of additional growth stage characteristics look e.g. at Scott and Bruce (1987), Smith et al. (1985), Miller and Friesen (1984).

[10] In usual life-cycle constructs the final stage is mainly described by "maturity" (Hanks et al. (1994)).

successor. It can be observed that only 13-25% of the successors are females (e.g. Ballarini and Keese (2006), Müller et al. (2011)). This situation indicates a gender gap and gender bias for business succession (e.g. Müller et al. (2011)) and leads inevitably to the question why women are underrepresented taking over the business and whether men are really more capable to manage business succession. Regarding the demographic change especially for Germany one of its consequences concerns a limited pool of candidates for business succession (e.g. Kay and Suprinovic (2013)). One solution could be the change of the awareness of male predecessors that male successors are favored (Blotnick (1984), Rosenblatt et al. (1985), Dumas (1990)). In other words, a lack of potential business succession candidates could be mitigated by female successors. To reach this goal it is essential to investigate if male and female successors are equally successful regarding organizational performance for business succession, and if the assumption of equal capabilities of men and women in business succession is stable, to increase the public awareness that women are as successful as men. This thesis contributes to the gender discourse for the special context of derivative ventures and shows empirically that men and women are equally capable to manage business succession and that gender could be a real success factor.

As a whole, the present work highlights the specific success factors team diversity, incentives, and gender as CSFs in the scope of a special context and different life-cycle stages of the firm. The focus is shift away from a generalized consideration of success factors to a specific one. This approach makes it possible to consider the specific context surroundings and to detect success factors that are of high importance for the organizations observed. The main purpose of the presented research framework is to offer a research framework that changes the usual success factor research approach. The chase after generalizable success factors that offer holistic solutions is seen as not appropriate any more for uncertain and dynamic environments as they can be found for original and derivative ventures and SMEs.

1.2 Structure and Research Study Description

The following section illustrates the structure of this thesis and provides detailed information on the research projects and their contents. The work is structured in five major chapters. At first, chapter 2 serves to differentiate the organizational forms university spin-offs, SMEs, and family businesses and to define entrepreneurs, business owners, and SMEs in general to evaluate and classify the research results in this work correctly. These terms are often differently understood and used and thus have to be discussed comprehensively. Furthermore, the difference between the research fields entrepreneurship and SME management shall be pointed out. Finally, this chapter briefly discusses the use of organizational performance as a dependent variable as well as its measuring. Chapter 3 introduces the methods used and explains the methodological basement of this thesis. Especially, the partial least squares method (PLS) is presented as this method is rather unknown in entrepreneurship and SME management research. Moreover, a guidance for interpretation is presented that facilitates the comprehension of the empirical PLS results in the different research projects in chapter 4. According to the research framework (see figure 1.1) chapter 4 focuses the three research projects concerning team diversity, incentives, and gender as specific success factors for the different life-cycle stages. The final part merges the results (chapter 5), discusses the empirical findings, and finally examines critically to which extent the specific success factors depend on the underlying life-cycle stage and context.

Chapter 4 includes the following research studies:

1. Moog, P. and Soost, C.: Does Team Diversity Really Matter? The Interaction of Team Diversity, Access to Financial Resources, Network, and Performance of University Spin-Offs. (Working paper)

2. Soost, C. and Moog, P.: Gender and Organizational Performance in Business Succession. (Working paper)

3. Baule, R. and Soost, C. (2015): Pay for Performance versus Nonfinancial Incentives in Small and Medium-Sized Enterprises, International Journal of Entrepreneurial Venturing. (Forthcoming)

Research Study 1: The study tries to answer the question of whether team diversity really matters as the question of whether team hetero- or homogeneity does affect performance is still unanswered (e.g. Chowdhury (2005)). Reasons for detrimental results concerning team diversity and performance could be that most team diversity research has been based upon upper echelon theory (Hambrick and Mason (1984)) from strategic management[11] that by the majority ignores mediating mechanisms which are able to discover the relationship between team diversity and performance better (Ilgen et al. (2005), Klotz et al. (2014), Carpenter et al. (2004)). Another issue concerning team diversity research is the use of an adequate statistical method to analyze the impact of team diversity on performance. Very often researchers investigate single-item demographic variables or simple indexing approaches that are only partially able to explore the black box between team diversity and performance. A more sophisticated method is SEM (structural equation modeling) that makes it possible to test different diversity items simultaneously in one model and to test mediation effects directly. The study follows the recommendations by Carpenter et al. (2004), and uses SEM, especially the PLS method to get improved and more valuable results regarding the relationship between team diversity and performance. Furthermore, context factors could influence the research results concerning team diversity that should be taken into account carefully. The data include 64 venture teams that founded university spin-offs in the life science industry namely in the

[11] The famous upper echelon theory suggest that firm performance and strategic choices are influenced by the top managers characteristics (e.g. demographic characteristics).

biotechnology sector. The investigation of university spin-offs discussing team issues is a usual practice in team research (for a detailed overview see e.g. Klotz et al. (2014)), and the importance of these spin-offs in high technology industry sectors for innovation, growth, and social welfare of the hole economy steadily increases (e.g. Shane (2004), Breznitz et al. (2008)). The use of data from university spin-offs makes it possible to provide practical implications for founders of these spin-offs and additionally could be used to add empirical evidence for team diversity research in general. The empirical study employs a mediating model calculated with the PLS method (for a detailed methodical description see chapter 3) and addresses the firm's network and the access to financial resources as mediating variables that constitute one of the most important success factors that influence performance positively (Granovetter (1973), Reagan et al. (2004), Vissa and Chacar (2009), Balkundi and Harrison (2006), Walter et al. (2006) for the firm's network and the resources-based view (Wernerfelt (1984)) for the access to financial resources). The following figure 1.2 shows the model used and is able to link team diversity with the most important success factors and performance.

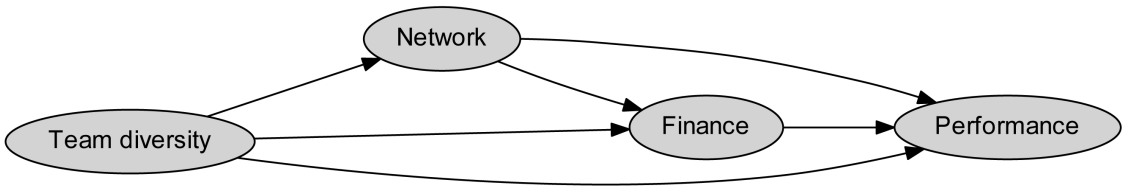

Figure 1.2. *Interaction of Team Diversity, Financial Resources, Network, and Performance*

As a whole, the empirical results reveal no direct effect of team diversity on performance whereby a mediating effect with the access to financial resources as mediating variable can be found. Thus, team diversity can be a success factor for university spin-offs. Furthermore, the results show the importance and influence of the ten diversity items for the whole model.

Research Study 2: This study deals with incentives that are necessary to gain and maintain high skilled workers for SMEs. Incentives represent a success factor that can have large effects on performance (e.g. Milkovich et al. (2011), Gerhart and Rynes (2003), Gerhart et al. (2009)) and these incentives do also play a great role for SMEs and not only for bigger companies (Behrends (2007)). The starting point is the assumption that SMEs are also capable to get and hold highly skilled workers despite SME's lack of resources, lower prominence on the labor market, and its predominantly rural company locations. But how is this possible when considering the several disadvantages of SMEs mentioned before? A reasonable instrument, therefore, could be the use of nonfinancial incentives. The research study 2 investigates the effects of nonfinancial and financial incentives on intrinsic motivation in SMEs as the use of financial incentives can be a double-edged sword regarding the effects on performance.[12]

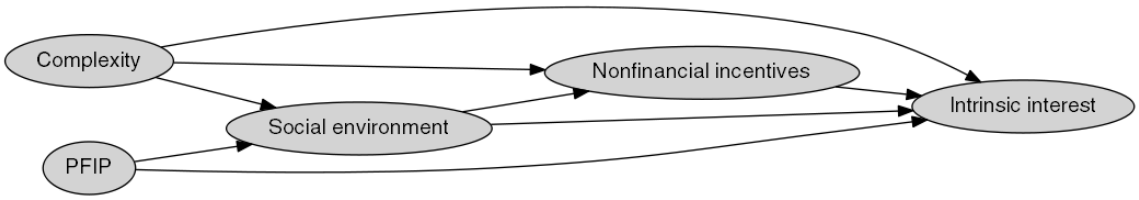

Figure 1.3. *Interaction of Complexity, Social Environment, Nonfinancial incentives, Pay for Individual Performance (PFIP), and Intrinsic Interest*

To test the hypotheses and to investigate the interactions of incentives and intrinsic motivation[13] a PLS model shown in figure 1.3 is calculated. Additionally, the model includes the variables complexity and social environment as predictors for the use of nonfinancial incentives and intrinsic motivation. Pay for individual performance (PFIP) represents the financial incentives and can be used synonymously for pay

[12] The positive impact of financial incentives on performance is heavily debated in psychologic economic research regarding the crowding-out effect of intrinsic motivation (e.g. Frey and Jegen (2001), Frey and Oberholzer-Gee (1997)) that could also decrease employee effort and thus reverses the aimed positive effect to a negative one. For a detailed discussion if pay for performance pays off refer to e.g. Eisenberger and Cameron (1996), Kunz and Pfaff (2002).

[13] Intrinsic motivation is analyzed as predictor for organizational performance. For further information see section 2.4.

for performance (PFP). The results will show that financial incentives only cause a small crowding-out of intrinsic motivation and that nonfinancial incentives are of high relevance for SMEs to offer employees a different kind of workplace as compared to big companies that is highly valued by the SME's employees. The use of the right incentives is therefore a strong success factor to influence intrinsic motivation and in turn organizational performance.

Research Studie 3: Regarding the female underperformance hypothesis[14] it is not surprising that women in business succession constitute an exception.[15] It is expected that women are as qualified as men with a view to managing firms after business succession. A correct application of the methods employed is important for unbiased results regarding gender and performance. The majority of quantitative empirical research results concerning gender use only small sample sizes and highly selective data which often lead to a lag of control variables, or no representative data regarding the overall population. The present study therefore tries to avoid these statistical weaknesses to the greatest extent and focuses on the influence of gender on objective and subjective performance measures for business successions of SMEs in German-speaking countries. Additionally, different biases in gender research shall be discussed extensively and the results will show that the female underperformance hypothesis cannot be supported any longer.

As explained above, the research studies presented in this thesis involve the specific success factors team diversity, incentives, and gender. They are context-related and investigated in different life-cycle stages of the firm. The developed research framework (see figure 1.1) is in contrary to usual success factor research and does

[14] The female underperformance hypothesis describes the assumption that female business owners perform less than their male counterparts (e.g. Fischer (1992), Rosa et al. (1996)). This underperformance of women compared to men is worthy of discussion and in the majority it is based on different biases in the empirical research results (Kalleberg and Leicht (1991), Du Rietz and Henrekson (2000)). For a detailed discussion of these biases see section 4.3.

[15] The amount of women as successors is estimated between 13-25% depending of the observed industry sector (e.g. Ballarini and Keese (2006), Müller et al. (2011)).

not pursue after generalizable success factors for all organizations. The environmental settings of original and derivative ventures and SMEs can be characterized by uncertainty and dynamics so that the research for specific success factors appears essential to provide new helpful insights that can enhance organizational performance. In this sense, this thesis introduces a new research approach for the research on critical success factors for original and derivative ventures and SMEs and simultaneously provides empirical evidence for the specific success factors team diversity, incentives, and gender.

Chapter 2

Definitions

As the aim of this thesis is to add empirical evidence to the area of entrepreneurship and SME management research the terms entrepreneur, business owner, SME management, and entrepreneurship have to be distinguished carefully to classify the results correctly and to understand why both research fields are highlighted in this work. Depending on the different organizational forms that are subject of the present research section 2.1 defines SMEs, family businesses, and university spin-offs. For the sake of completeness and commonality, however, section 2.2 differentiates and defines the terms entrepreneur and business owner. The differences between entrepreneurship and SME management research are explained in section 2.3, especially the distinction of original and derivative ventures. The final section 2.4 discusses the success measures used in this thesis.

2.1 SMEs, Family Businesses, and University Spin-Offs

A clear definition of *SMEs* does not exist. However, in general two different definitions of SMEs in Germany stated by the European Union and the Institute of

SME Research Bonn are used for classification. The differentiation of the European Union is shown in the following table. In contrast, the Institute of SME Research Bonn only distinguishes between small enterprises (employees < 10 and sales ≤ 1 million €) and medium-sized enterprises (employees < 500 and sales ≤ 50 million €).

Type	Employees		Sales in million €		Balance sum in million €
Microenterprise	< 10	and	≤ 2	or	≤ 2
Small Enterprise	< 50	and	≤ 10	or	≤ 10
Mid-size Enterprise	< 250	and	≤ 50	or	≤ 43

Table 2.1. *SME Definition European Union*

According to the definition of the Institute of SME research Bonn 99.6% of all enterprises in Germany are SMEs and they employ about 59.4% of all employees (BMWI (2012)). In this sense, SMEs have an enormous relevance for the economy and therefore the research on success factors for these kind of organizations is of high importance.

SMEs in general can be further classified into SMEs and *family businesses*. As for SMEs, a clear definition of family businesses does not exist (e.g. Miller et al. (2007), Villalonga and Amit (2006)). Most of the existing definitions for family businesses focus on ownership, management involvement, and generational transfer.[1] The Institute of SME research Bonn constitutes a family business if ownership and control of the firm are unified by the family members. Additionally, these family members must be part of the management board and must own at least 50% of the business. A strict separation between family firms and non-family firms appears questionable regarding the broad characteristics that can be used to determine a family business. These could be e.g. voting rights of the family members, a specific corporate culture, positions in the supervisory board etc. According to this wide

[1] For a detailed analysis look e.g. at Astrachan et al. (2002) and Miller et al. (2007).

definition approach family firms can be as well big companies that are under a high family influence.[2] Thus, size categories do not play a role for family firms.

In this thesis the SME definition of the Institute of SME Research Bonn is used to classify SMEs especially for research study 2. In this study the use of incentives for high-skilled worker is analyzed. The probability of using incentives to remunerate employees is higher for bigger SMEs so that SMEs up to 500 employees are investigated. Family firms that are the subject of investigation in research study 3 are defined by three major characteristics. These are ownership and voting share in %, family share in executive management in %, and family share in the board of directors in %. If the sum of these characteristics is $\geq 100\%$ the firm is classified as family firm.[3] This classification considers a wider range of different family firms without a size limit. In this case the empirical results concerning the impact of gender on success in business succession are generalizable for all kind of family firms.

Research study 1 investigates the impact of team diversity on performance for *university spin-offs*. Spin-off ventures are defined as new ventures that emerge from research organizations (e.g. Helm and Mauroner (2007), Steffensen et al. (2000)). These ventures commercialize research results from universities or other research institutions and therefore are often called academic or research based spin-offs (Clarysse and Moray (2004)). Steffensen et al. (2000) write on page 96: "A spin-off is a mechanism for technology transfer because the new company is usually formed in order to commercialize a technology which originated in (1) a government R&D laboratory, (2) a university, or (3) a private R&D organization." Research-based spin-offs could be of high macroeconomic importance (Shane (2004), Storey and Tether (1998)) and therefore are more and more focused by entrepreneurship researchers.

[2] The most famous example for a big listed company that could be classified as a family firm is BMW where the family Quandt/Klatten has a significant influence on management decisions.

[3] This approach is taken from the Swiss Research Institute of Small Business and Entrepreneurship of the University of St.Gallen.

2.2 Entrepreneurs and Business Owners

> "My own personal experience was that for ten years we ran a research center in entrepreneurial history, for ten years we tried to define the entrepreneur. We never succeeded. Each of us had some notion of it - what he thought was, for his purposes, a useful definition. And I don't think you're going to get farther than that." (Cole (1969), p. 17)

The quotation of Cole (1969) illustrates the problems to define the entrepreneur and therefore also the difficulty to distinguish the entrepreneur from the business owner. Additionally, talking about entrepreneurs and business owners often leads to a misunderstanding concerning the fact that entrepreneurs are mainly recognized only as founders of new firms (Gartner (1988), Shane and Venkataraman (2000)). This is only half the story, as the term entrepreneur involves much more. When looking into the standard textbook of Longenecker et al. (2012) it becomes clear that entrepreneurs are also second-generation firm owners, franchisees, owner-managers who have bought existing firms, or individuals in not-for-profit organizations who think and act entrepreneurially. This shows that entrepreneurs and business owners should be distinguished by their way of thinking and acting and not by their status or traits and characteristics (Van de Ven (1980), Jenks (1950), Kilby (1971)). This insight leads to a more appropriate definition of the entrepreneur as an individual whose way of thinking and acting is characterized mainly by opportunity seeking (Shane and Venkataraman (2000)) and innovation (Schumpeter (1934)). Now the distinction between an entrepreneur and the business owner appears more clearly. Business owners and entrepreneurs could be very similar concerning characteristics and traits but their targets are different. Business owners are more concentrating on managing and administration whereas entrepreneurs always search the opportunity to grow, create, and change. Basically, the present thesis does not differentiate between entrepreneurs and business owners in the samples used. Even if the charac-

terization of these two personal types can be used as explanation for specific behavior and outcomes it is not considered as necessary here.

2.3 Entrepreneurship and SME Management

The difference between the research fields *SME management* and *entrepreneurship* primarily concerns two divergent orientations even if these two fields of research might overlap as well (Carland et al. (1984)). While SME management describes a kind of strategic management research especially for SMEs and how to run a business (e.g. Carter et al. (1994)), entrepreneurship research concentrates on the investigation of the creation of new organizations (Gartner (1985), Low and MacMillan (1988)), and "the study of sources of opportunities; the processes of discovery, evaluation, and exploitation of opportunities; and the set of individuals who discover, evaluate, and exploit them" (Shane and Venkataraman (2000), p. 218). As a whole, the research on entrepreneurship is more process-oriented with the goal to understand how value creation takes place whereas SME management tries to find out the adequate recipe for managing a SME successfully. Even though, SME management and entrepreneurship pursue divergent goals and the necessity of combining both research fields is crucial for organizations to legitimate, grow, and to be successful.

Furthermore, entrepreneurship research can be divided into four subcategories. The following table 2.2 shows the different types of new venture formation proposed by Szyperski and Nathusius (1977). Talking about entrepreneurship research primarily implies talking about business creation. This work takes original ventures as well as derivative ventures as independent foundations into account. For independent foundations the entrepreneur(s) and his activities play a central role whereas dependent foundations are executed by already existing organizations.

	Original Venture	Derivate Venture
Independent foundation	**Business creation**	**Business succession**
Dependent foundation	Institutional business creation	Merger/ reorganization

Table 2.2. *Types of New Venture Formation (Source: Szyperski and Nathusius (1977), page 27)*

The research projects of this thesis can be categorized into entrepreneurship and SME management research. The research on team diversity analyzes original ventures and the investigation of gender differences is done for derivative ventures. The research project concerning the specific success factor incentives belongs to SME management research.

2.4 Success Measures

Talking about success factors and their impact on performance simultaneously signifies to discuss how to measure success that is influenced by these diverse success factors. This chapter gives a brief overview about success measures in entrepreneurship and SME management research. Tiger Woods once said that he does not measure his success by the quantity of his victories but rather by his annual improvement.[4] So his understanding of success differs from the usual interpretation of success that the most of us have when thinking about success. This small example shows that success could have many faces and that it can be defined by reaching your own goals (e.g. Moog (2004)) whereby these goals can be of a subjective or objective nature.

[4] Tiger Woods is the worlds most famous golfer. His conception of success was found in Draksal (2005).

Usual objective success measures are in general key figures concerning efficiency, growth, profit, size, liquidity etc. whereby the most common objective success measures used are number of employees, sales, and employee and sales growth rates (Carton (2004), Carton and Hofer (2006), Brüderl and Preisendörfer (1998), Klandt (1984), Venkatraman and Ramanujam (1986)). Growth measures and especially sales growth are highly important as key objective success measures because they correlate with other financial measures that describe the development of the organization (Brüderl and Preisendörfer (1998), Albach et al. (1985)). The minimal success target any organization and what business owners have in common is the survival of the organization (Amburgey et al. (1990), van Praag (2003), Brüderl et al. (2007)) and this survival makes it possible to reach economic and personal goals. Reasonable for the predominant use of objective success measures is the fact that financial measures are mainly easy to collect and all businesses that try to survive have to reach financial success to a certain extend (Walker and Brown (2004), Marlow and Strange (1994)). The use of objective success measures is problematic if business owners and entrepreneurs do not pursue the target of growing their businesses. In this case subjective success measures appear more suitable to describe success.

Subjective goals can be of high relevance for SMEs as a majority of SMEs are owner-managed and these owners often do not have to comply externally controlled goals as it is normal for big listed companies. Consequently, subjective performance measures measure the degree of achievement of personal goals of the business owners (Cabrera-Suárez et al. (2011), Moog and Soost (2013)) and not all business owners concentrate on growth and financial success (Storey (1994), Cholotta (2012)). These personal goals could be independency, self-realization, reputation, and implementation of own ideas. In turn, the former influence the personal satisfaction of the business owner and make it possible to measure success by personal or job satisfaction (e.g. Rauch and Frese (2000)) especially for SMEs. Further subjective success measures could be e.g. autonomy, job satisfaction, and the work-life balance (Walker and Brown

(2004), Kuratko et al. (1997)). The importance of subjective success measures is once more highlighted by Jennings and Beaver (1997) on page 63 taken from Walker and Brown (2004), : "...contrary to popular belief, and a great deal of economic theory, money and the pursuit of a personal financial fortune are not as significant as the desire for personal involvement, responsibility and the independent quality and style of life which many small business owner-managers strive to achieve. Consequently, the attainment of these objective becomes one of the principal criteria for success, as defined by the entrepreneur/ owner-manager."

In this thesis subjective and objective success measures are applied to evaluate organizational performance. In detail, these are the usual objective success measures *number of employees*, *sales*, and *employee and sales growth rates*. As subjective success measures *overall satisfaction* and *growth prospects* are used. The subjective success measures are applied on research study 3 that investigates the effect of gender on performance in business succession. Brush (1992) carries out that females often have diverse key motivations to manage a business in contrast to men. Therefore, subjective success measures shall be used for this study as well as usual objective success measures. Additionally, the subjective evaluation of growth prospects shall be analyzed in this study. As to research study 1, it is assumed that the overall motivation of newly founded university spin-offs is to achieve financial success and therefore subjective success measures are not applied in this study. The analysis of the relationship between incentives and performance in study 2 uses intrinsic motivation as a dependent variable. Intrinsic motivation is seen as a subjective performance measure and correlates highly with organizational performance (Milkovich et al. (2011), Frey and Osterloh (2002)) and therefore is used here.

Chapter 3

Methodology and Methods

This work has to be classified as research that is of deterministic nature and that follows a positivistic research paradigm.[1] The task is to analyze CSFs that are of high relevance for organizations in entrepreneurship and SME management research whereby the success of the organization constitutes the superior objective. The results of the different research projects mentioned in this work are assumed to be universally valid, tested with appropriate statistical methods and therefore comply with the positivistic research paradigm. Nevertheless, it must be noted that complex research issues make it difficult to find absolute deterministic solutions (e.g. Anderson and Starnawska (2008), Bruyat and Julien (2001)). However, a wider discussion of different methodological alternatives such as philosophical underpinning of this research projects in special and for entrepreneurship and SME management research in general will not be pursued here as a positivistic research paradigm is seen as the most appropriate methodology to produce practical and policy relevant findings (e.g. Anderson and Starnawska (2008)).

[1] Positivist social science can be seen as an epistemological position that stands for the application of methods of the natural sciences to the study of social reality and beyond (Bryman and Bell (2011)). As Neuman (2000) formulates on page 66: "Positivism sees social science as an organized method for combining deductive logic with precise empirical observations of individual behavior in order to discover and confirm a set of probabilistic causal laws that can be used to predict general patterns of human activity".

All research projects in this work are purely of quantitative empirical nature with cross-sectional data. Beside descriptive statistics, the multivariate statistical methods used are ordinary least squares regressions (OLS) and PLS regressions. In this connection, OLS is used as a standard method for empirical research, whereas PLS enjoys greater popularity in the recent years (Hulland (1999)) and is mainly used in psychology, marketing, and management research (Reinartz et al. (2009)). The PLS method can be seen as a nontraditional alternative to SEM that has lower model demands concerning sample size and distributional assumptions (Henseler et al. (2009), Lohmöller (1989), Chin (1998b)). Regarding the sample sizes of $n = 63$ and $n = 169$ for the research studies 1 and 2 and not normally distributed data, PLS seems to be the appropriate statistical method. Moreover, PLS is often used to confirm hypotheses that are not empirically verified yet (Vinzi et al. (2010)) that especially matters for study 2. Additionally, PLS makes it possible to measure mediating effects directly in the model that is of high importance for the research on team diversity and incentives. SEM and PLS investigate the interaction between latent variables that are linked by hypotheses the researcher proposes and therefore SEM and PLS can be categorized as hypotheses testing procedures. This chapter aims at introducing and discussing the PLS method as this approach is used less often and thus less well known. Furthermore, there is given a guidance for interpretation in section 3.3 to simplify the interpretation of the empirical results for the research on team diversity and incentives in chapter 4.1 and 4.2.

3.1 The PLS Model

Before the PLS algorithm will be introduced figure 3.1 shows the general PLS structure that consists of the structural model and the measurement models that are also called latent variable constructs. For the sake of simplicity figure 3.1 shows only a model with 2 latent variables that is optionally expandable according to the needs

of the research question. A latent variable is a not directly measurable variable that is inferred from other measured variables (e.g. Vinzi et al. (2010)).[2]

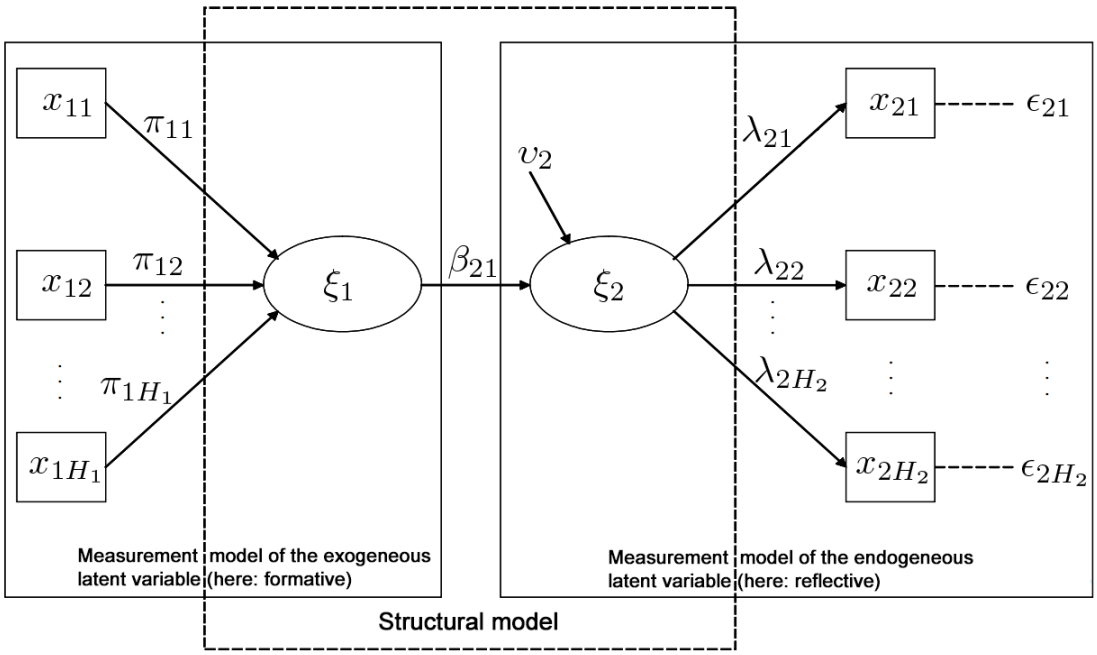

Figure 3.1. *PLS Model with Two Latent Variables (Source: Henseler (2005), page 2)*

The following explanations base mainly on the work of Henseler (2005) who gives an excellent and clear overview of the functionality of the PLS algorithm and the PLS method by itself.[3] Figure 3.1 shows the latent variables ξ_j and the according measured items x_{jh}. The latent variables are not directly measurable and only become tangible by their measured items. The researcher should select the adequate measurement model and observe items that are highly appropriate for the underlying latent variables and to avoid misspecification (Jarvis et al. (2003)). These latent variables could be measured formatively or reflectively. In the reflective case (right side of figure 3.1) the latent variable causes the measured items captured by easy linear regressions ($x_{jh} = \lambda_{jh}\xi_j + \epsilon_{jh}$, λ_{jh} are the regression coefficients and ϵ_{jh}

[2] A plain example for a latent variable is drunkenness. Instead of measuring drunkenness directly it can be measured as a latent variable. The according measured variables that determine drunkenness are then e.g. blood alcohol concentration, responsiveness, etc. For further explanations see e.g. Nitzl (2010).

[3] For a deeper analysis look at Vinzi et al. (2010) or Bliemel et al. (2005).

the corresponding error term) whereas in the formative case (left side of figure 3.1) the latent variable is caused by their measured items that can be calculated with a linear combination of the x_{jh} for the corresponding ξ_j ($\xi_j = \sum_h \pi_{jh} \cdot x_{jh} + \sigma_j$, π_{jh} is the weight of the item x_{jh} for the calculation of the linear combination and σ_j the corresponding error term). The structural model links the latent variables via linear regression whereby endogenous latent variables depend on the other exogenous latent variables in the structural model ($\xi_j = \sum_i \beta_{ji} \cdot \xi_i + \upsilon_j$, β_{ji} are the regression coefficients and υ_j the corresponding error term). To estimate the structural and measurement models the PLS algorithm is of central importance that will be introduced in the next section.

3.2 The PLS Algorithm

The estimation of PLS path models is framed by the initialization, the PLS algorithm to estimate the not directly measurable latent variables ξ_j and the calculation of the path coefficients β_{ji} that can also be called structural model parameters. The PLS algorithm represents the most challenging part of the PLS path model estimation and will therefore be introduced here. In general, the PLS algorithm is an iterative process. To estimate the not directly measurable latent variables ξ_j two different estimations are combined:

(1) The inner estimation Z_j from the structural model and

(2) the outer estimation Y_j from the measurement model.

Each of these two estimations are split in two steps whereby

(a) first will be calculated weighting factors that then are used to

(b) estimate the resulting Z_j and Y_j.

This two step approach is reasonable for the name **Partial** Least Squares. The following table 3.1 shows the iterative process of the PLS algorithm that will be explained in the next paragraphs. The different steps are enumerated by 0, 1a, 1b, 2a, and 2b according to the explanations above. Stage 0 describes the initialization that determines a starting value for each latent variable by setting this latent variable equal to the first measured item of the latent variable construct. Obviously, the initialization step will not be repeated.

Stage	Steps		Formal Description
0	Initialization		$\forall j : Y_j := x_{j1}$
1a	Preparation inner estimation	Zentroid Weighting Scheme	$\forall j,i : e_{ji} := \begin{cases} sgn(corr(Y_i,Y_j)), \exists \text{ relation between } \xi_i \text{ and } \xi_j; \\ 0, \text{else.} \end{cases}$
		Factor Weighting Scheme	$\forall j,i : e_{ji} := \begin{cases} corr(Y_i,Y_j), \exists \text{ relation between } \xi_i \text{ and } \xi_j; \\ 0, \text{else.} \end{cases}$
		Path Weighting Scheme	$\forall j,i : e_{ji} := \begin{cases} b_{ji}, \exists \text{ relation between } \xi_i \text{ and } \xi_j; \\ corr(Y_i,Y_j), \exists \text{ relation between } \xi_i \text{ and } \xi_j; \\ 0, \text{else.} \end{cases}$
1b	Inner estimation		$Z_j := \varphi_j \cdot \sum_i e_{ji} Y_i$
2a	Preparation outer estimation	Reflective case	$\pi_{jh} := cov(x_{jh},Z_j)$
		Formative case	$\pi_j := (X_j^T X_j)^{-1} X_j^T Z_j$
2b	Outer estimation		$Y_j := f_j \cdot \sum_h \pi_{jh} x_{jh}$

Table 3.1. *PLS Algorithm*

(1) The inner estimation Z_j from the structural model

The following inner estimation can be accomplished by using the centroid, factor, or path weighting scheme. The differences are listed in table 3.1 whereby mainly the path weighting scheme is preferred (Henseler (2010)). Therefore only the path weighting scheme is explained here. It is important to distinguish between latent variables that are successors or predecessors of other latent variables for calculating the inner weights with the path weighting scheme. To estimate the inner weights e_{ji} for the predecessor latent variables the e_{ji} are set equal to the multiple regression coefficients b_{ji} of the regression between the ξ_j as dependent and all the predecessors ξ_i as independent variables. The inner weights for successor latent variables are calculated by the correlation of the ξ_j and related ξ_i. If the inner weights e_{ji} are

estimated the inner estimate Z_j of the latent variable can be calculated as sum of the other latent variables multiplied by the inner weights. φ_j is needed for standardizing Z_j.

(2) The outer estimation Y_j from the measurement model

The outer estimation depends on the used measurement models. For reflective measurement models the outer weights are the regression coefficients estimated in regressions of the variables x_{jh} as dependent and the inner estimates Z_j as independent variables. Considering, that all values are standardized the regression coefficients are equal to the covariance of the x_{jh} and the corresponding Z_j. For formative measurement models the outer weights π_{jh} are a regression coefficient vector π_j of a multiple regression of the Z_j as dependent and the x_{jh} as independent variables whereby X_j are the x_{jh} transformed in a matrix. The outer estimation of the latent variables Y_j is done by a linear combination of the measured variables x_{jh} with the outer weights π_{jh}.

The steps 1a to 2b will be repeated as long as a defined abort criteria is fulfilled. Following Wold (1982), the iterations are stopped if the sum of the squared change of the weightings falls below 10^{-5}. Afterwards, the structural model parameters β_{ji} can be calculated by using multiple regression with ξ_j as dependent and all their predecessor latent variables ξ_i as independent variables.

3.3 Guidance for Interpretation

The results of a PLS model calculated with common software packages[4] can be categorized into results for

[4] The most common software packages for PLS are SmartPLS and AMOS (analysis of moment structures). AMOS is based on SPSS whereas SmartPLS was initially developed by Christian M. Ringle, Sven Wende, Jan-Michael Becker. For a extended overview look at Temme et al. (2006).

1. the weights or loadings for the measured items of each construct depending on the reflective or formative measurement of the corresponding latent variable and the path coefficients between the latent variables,
2. key figures for the evaluation of the model,
3. and resampling techniques like the bootstrapping method to validate the model parameter.[5]

This section briefly discusses how the results mentioned in item 1 must be interpreted. The items 2 and 3 will be covered comprehensively in chapter 4.1 and 4.2. As discussed before PLS investigates the interaction between latent variables that are linked by hypotheses the researcher proposes. The results for the structural model consists of the path coefficients that link the latent variables. These have to be analyzed with regard to their sign, absolute value, and statistical significance. The latter is determined by the bootstrapping method whereby the sign and the absolute value derive from the regression of the latent variable values after the iterative PLS algorithm (see section 3.1). The standardized path coefficients can adopt values from -1 to 1 whereby values near 0 indicate a weak and values near 1 and -1 a strong relationship between the latent variables that are linked by a path. A minimum requirement for the path coefficients does not exist. Lohmöller (1989) takes path coefficients at least up to 0.1 into consideration while path coefficients up to 0.2 in general are considered as important (Chin (1998a)). Thus, a statistically significant path coefficient greater 0.2 can be interpreted as empirical support for the underlying hypothesis the researcher expects if the corresponding sign confirms the assumed relationship.

[5] The bootstrap method is used to calculate test statistics. From the underlying sample are drawn several sub samples with replacement and a specified size n. With the sub samples the calculation of test statistics is possible. The number of sub samples should be sufficiently high (in this work up to 5000 sub samples were used to calculate the test statistics) and the size n in the range of the original data size. For detailed information about the bootstrapping method look at Efron (1979) and Efron and Tibishirani (1993).

The results for the measured items of the measurement models depends on a reflective or formative measurement. The estimated loadings of the measured items for the reflective constructs show the shared variance of the items with the corresponding latent variable. In other words the loadings show how good the items reflect the latent variable. For the formative measured constructs the estimated weights show how strong each item influences the latent variable. The results of the measurement models are tested for statistical significance as the results for the structural model with the bootstrapping method.

Chapter 4

Specific Success Factors

The following chapter involves the three research studies on specific success factors for original ventures, derivative ventures, and SMEs. As introduced in section 1.1 and based on the research framework this thesis distinguishes research on success factors that influence organizational performance and the research on "general" and "specific" success factors. Specific success factors represent those factors that are especially effective in a specific context and for a specific organizational form. General success factors, by contrast, influence performance independently of the underlying context and can be understood as all-purpose weapon to realize organizational performance.[1] The purpose of this distinction is to enhance the success factor research and to deliver more practice-relevant results. The specific success factors highlighted in this thesis are **team diversity**, **incentives**, and **gender**.

The following figure 4.1 shows the underlying research framework once more with the corresponding research studies. The studies in this chapter are organized in accordance with the life-cycle stages in the research framework. First, the research study concerning team diversity and performance for newly founded university spin-

[1] A detailed description is given in chapter 1.

offs is shown, then follows the study of incentive effects for SMEs, and finally gender differences in business succession shall be analyzed.

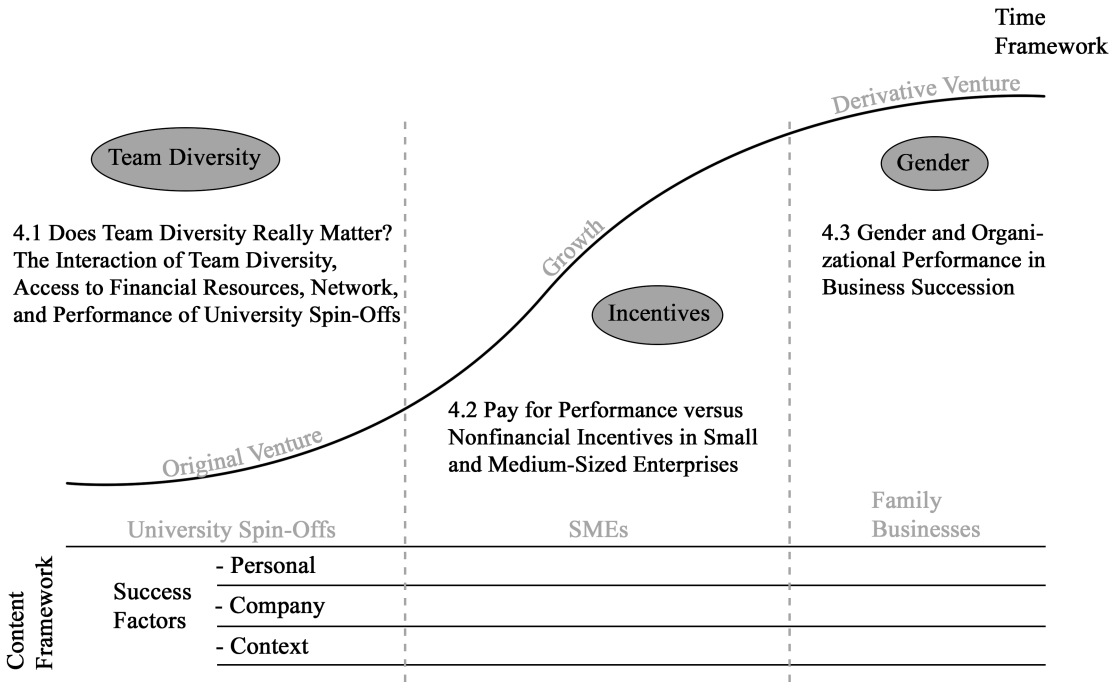

Figure 4.1. *Research Framework and Corresponding Studies*

The selection criteria to identify specific success factors have a practice and scientific dimension. In this sense, specific success factors should be of high practical relevance for the organizations observed and the study results should contribute to existing theory and – even better – close a research gap. At the beginning of each chapter a brief explanation is given why precisely these success factors are chosen in this thesis and why these specific success factors do represent CSFs.

4.1 Does Team Diversity Really Matter? The Interaction of Team Diversity, Access to Financial Resources, Network, and Performance of University Spin-offs.

Factors concerning the founding team are seen as important drivers for spin-off success (e.g. Clarysse and Moray (2004), Ensley and Hmieleski (2005)) and the success factor framework for spin-offs taken from Helm and Mauroner (2007) presented in figure 4.2 emphasizes this relationship once more.

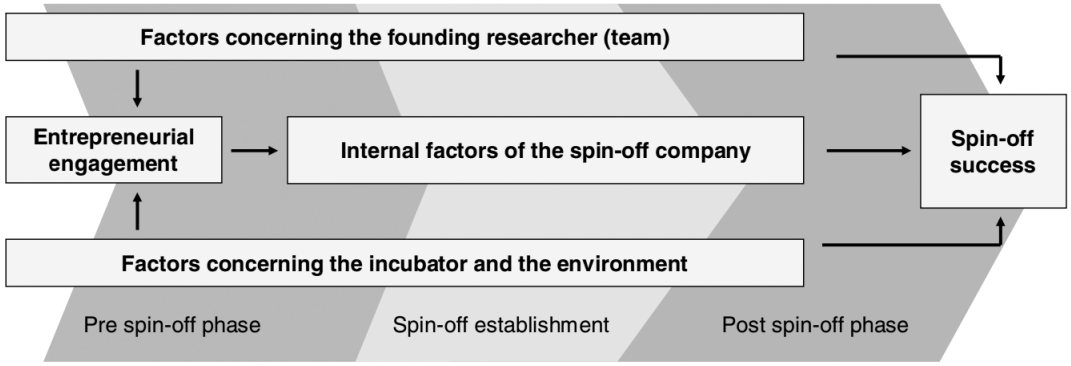

Figure 4.2. *Success Factors Spin-Offs (Source: Helm and Mauroner (2007), page 240)*

Regarding the entrepreneurship literature reveals that the question how a team has to be composed to affect organizational performance is still unanswered. This is mainly reasonable due to the fact that the relevant empirical results are contradictory (e.g. Klotz et al. (2014), Chowdhury (2005)) which makes, as a result, it almost impossible to frame recommendations for entrepreneurial teams. This current research situation represents an unsatisfactory condition and the question arises if team diversity really represents a success factor.

According to the approach of specific success factors in this thesis it is assumed that team diversity is rather important for university spin-offs. Reasons for this

assumption are the significance of access to financial resources and broad networks for university spin-offs (Walter et al. (2006), Helm and Mauroner (2007), Vanaelst et al. (2006)) that could be positively or negatively influenced by team diversity. In this sense, it is assumed that team diversity influences organizational performance in university spin-offs indirectly in a positive manner. The analysis of indirect effects in team research concentrates mainly on the relationship between team processes and emergent states and performance[2] whereby alternative relationships should be investigated as well. Therefore, the following research study links team diversity with access to financial resources, networks, and organizational performance. This factor combination illustrates a first and easy way to analyze the effects of team diversity in more detail.

Schwarz et al. (2006) e.g. build a PLS model that links team diversity, team size, team experience, labor norms, communication, and success. However, they observe a positive effect of team diversity on labor norms only and no further statistical significant direct, either indirect effect of team diversity in their model. The approach to use sophisticated statistical models that link important factors for new ventures with team diversity seems to be a promising way to open the black box between team diversity and performance. The combination of these factors should be oriented at the specific context according to the research framework presented in this thesis. The following sections represent the entire research study and deliver helpful recommendations for team foundations in university spin-offs and thus deliver a contribution to existing team research.

[2] Excellent overviews concerning these relationships are given by Klotz et al. (2014) and Mathieu et al. (2008).

4.1.1 Introduction

In the last two decades, the research on team effectiveness in entrepreneurship and management literature has dramatically risen (see e.g. Cohen and Bailey (1997), Mathieu et al. (2008), Klotz et al. (2014)). But, does team diversity really matter? The question if team diversity, namely team hetero- or homogeneity affects performance is still unanswered. There exists an ongoing and still unresolved debate if heterogeneous teams are more successful and better than their homogeneous counterparts (see e.g. Klotz et al. (2014)). In general, literature cannot find a clear effect of team diversity on performance (e.g. Chowdhury (2005)). Thus, there are still observed mixed results in different studies, due to data restrictions, operationalization of teams and team diversity and neglection of mediation effects of major success factors (e.g. Ensley and Hmieleski (2005)). Regarding this state of the current research results, answering the question of the most promising team composition seems to be an impossible task. Therefore, this study concentrates on the effects of team diversity on performance in general and other success factors like the firm's network and financial resources of the firm at the same time trying to contribute some new insights into this debate based on empirical data.

Based on the data it cannot be found a direct effect of team diversity on firm performance, either positive or negative. Therefore, the study tries to look deeper into the team composition itself and related effects of team diversity and other important success factors. In this sense, direct and indirect effects of team diversity are the subject of investigation. The interactions of important success factors regarding the resource-based view (Wernerfelt (1984)) and the network success hypothesis and social capital (Granovetter (1973), Brüderl and Preisendörfer (1998)) are investigated. For these the firm's network and its firm's financial resources are employed. The results show that team diversity is essential for the firm's network and could enhance the possibility to get financed and thus, to have an indirect, significantly positive

impact on firm's performance. Additionally, team diversity has a positive impact on the access to financial resources that in turn lead to higher performance of the firm. Therefore, the results emphasize to choose a more heterogeneous team composition and the use of the partial least squares method makes it possible to observe the importance and influence of each diversity measure in the model.

Data from university spin-offs in the life science industry namely the biotechnology sector is used. University spin-offs in knowledge- and technology-based industries have become an important wealth-creating factor (Shane (2004)) and they are often seen as the cornerstone of innovation, growth and social welfare. Through university spin-offs, public research results are commercialized and serve as important vehicles for technology transfer. Even more, they can alter existing industrial sectors or establish new ones (Breznitz et al. (2008)). There has been a substantial rise in the creation of these spin-offs in the last years in the US, Europe and many other industrialized countries due to political support measures, a growing VC industry and growing interest on the part of researchers themselves (Mustar et al. (2008), Lam (2010), Venkataraman (2004)). In subsectors such as biotechnology, university spin-offs represent the majority of new ventures and are thus of high political interest as well. Compared to normal start-ups, university spin-offs are founded by academics who transfer technology or technology-based ideas developed within a university to the private sector with the aim of transforming scientific findings into marketable processes and products (Helm and Mauroner (2007), Steffensen et al. (2000), Walter et al. (2011)). Given their macroeconomic importance, research on university spin-offs is essential to understand the main factors affecting the success of these biotechnology start-ups/spin-offs. Team size, team composition (e.g. human capital), institutional set-ups (like e.g. incubators) or environmental settings (e.g. financing and social capital) are analyzed as success factors. These factors are often tested separately and in different ways, but not in interaction with each other (Ilgen et al. (2005)). Moreover, the team composition often is focused only on

single aspects concerning diversity so there is a high probability for measurement errors and biased results (Carpenter et al. (2004)). The data allows to shed up light into the interactions of team diversity, important success factors, and performance for university spin-offs by using a more suitable research methodology (PLS) as required.

The contribution of this study is hence (a) to deliver new insights into the discussion of team diversity regarding homo- and heterogeneity and (b) to show how team diversity interacts with other success factors such as networks and financing especially for university spin-offs. The study is organized as follows: In the next section the theoretical background and effects of team diversity on firm outcomes is discussed briefly; the section that follows discuss the hypotheses. Then the data and methodology is explained. The final section, includes the discussion of the results and study limitations.

4.1.2 Theoretical Background

Upper Echelon Theory and Team Effectiveness Frameworks

Most team diversity research is based upon the upper echelon theory (Hambrick and Mason (1984), Hambrick (2007)) from strategic management, suggesting that management strategy and firm success primarily depends on the demographic characteristics of the top management team. Hambrick and Mason (1984) originally devised this theory for bigger enterprises even though the influence of an entrepreneurial team in small and medium-sized enterprises on firm performance should be even greater than the influence of a top management team in bigger companies (Greiner (1998), Ensley et al. (2006)). This is due to a primary lack of organizational structures in new venture firms that allow greater latitude of the entrepreneurial team and therefore a higher influence on firm performance.

To discover the relationship between team diversity and team outcome it is obligatory to analyze direct effects as well as critical mediating mechanisms (indirect effects). Upper echelon research on team diversity often does not pay attention to these indirect effects (Ilgen et al. (2005)) and cannot open the black box between team inputs and performance (Klotz et al. (2014), Carpenter et al. (2004)) while in organizational behavior research the relationship between team diversity and team outcomes is e.g. explained by the input-process-outcome framework (IPO) (McGrath (1964)) and the input-mediator-outcome framework (IMO) (Ilgen et al. (2005)). These team effectiveness frameworks provide the foundation for entrepreneurship researchers to develop their studies about the relationship of teams and outcomes and are more capable to explain this relationship. The IMO framework that constitutes the advanced IPO framework provides that outcomes (O) are the result of inputs (I) and mediators (M) (for a detailed explanation see Ilgen et al. (2005)). Following Klotz et al. (2014) these inputs could be prior experience, social capital, personality and general ability. The mediators are team processes (transition processes, interpersonal processes, action processes) and emergent states (collective cognition, cohesion, team confidence, psychological safety, affective tone) while the outcomes could be sales growth, profitability, number of employees, innovativeness, satisfaction and well-being.

The upper echelon approach and the IPO and IMO frameworks represent the theoretical basement in two ways: (a) to identify prior research results regarding team diversity effects (see paragraph team diversity and outcomes) and (b) to develop the hypotheses (section 4.1.3) and empirical testing (section 4.1.5) that in comparison to the classical IMO framework chose different mediators.

Team Definition

Before starting to analyze prior research results regarding team diversity effects the

term team has to be defined properly. According to Mathieu et al. (2008) and Kozlowski and Bell (2003) one definition is, that teams are

> ”collectives who exist to perform organizationally relevant tasks, share one or more common goals, interact socially, exhibit task interdependencies, maintain and manage boundaries, and are embedded in an organizational context that set boundaries, constrains the team, and influences exchanges with other units in the broader entity.“ (Kozlowski and Bell (2003), p. 6)

Additionally Ensley et al. (1998) state that entrepreneurial team members must (1) have established the firm, (2) have a financial interest and (3) have influence on strategic choices; Ucbasaran et al. (2003) corroborates these identifying aspects of founding teams. The analysis follow Kozlowski and Bell (2003) and Ensley et al. (1998) and concentrates on teams and team members complying the requirements mentioned above.

Team Diversity and Outcomes

The effects of team diversity on firm performance are the topic of a controversial debate (Webber and Donahue (2001)). This is not surprising, regarding the two diametrically opposed theories of Byrne (1971) and Horwitz (2005), that on the one hand favor homogeneity within the team and on the other hand heterogeneity. The similarity-attraction paradigm (Byrne (1971)) states that team homogeneity pushes team cohesion and motivation, thereby enforcing interaction among team members. According to this view, team heterogeneity has a negative impact on firm performance. Horwitz (2005) shows that homogeneous teams are capable of solving exercises with high coordination needs better than their heterogeneous counterparts. On the contrary, based on a theory of cognitive resource diversity, Cox and Blake (1991) demonstrate that heterogeneous teams are more powerful than homogeneous

teams. These teams are more innovative, more creative and able to solve problems much easier on the strength of their diversity.

Thus, selecting the right team can constitute a first and easy way to affect firm performance. But how important is team composition really due to oppositional theories? This section tries to give a brief overview about the effects of team diversity on performance that does not claim completeness regarding empirical studies from management, organizational behavior research and entrepreneurship literature based upon the upper echelon approach and IMO and IPO frameworks. To analyze the team diversity effects on performance the overview articles of Mathieu et al. (2008), Klotz et al. (2014), and Cohen and Bailey (1997) are analyzed.

Positive effects. In case of demographic diversity Kilduff et al. (2000) e.g. found that diversity in age has a positive influence on performance (e.g. units sold, gross marketing contribution, market share, and other performance indicators) as well as tenure (Jehn and Bezrukova (2004)). Furthermore, Eisenhardt and Schoonhoven (1990) show that team size leads to higher sales growth. Same results are found by Campion et al. (1993) and Magjuka and Baldwin (1991) that team size is positively related to productivity. McGee et al. (1995) and Eisenhardt and Schoonhoven (1990) found that functional diversity like heterogeneity in industry experience and work experience affects performance positively. Additionally, Ensley and Hmieleski (2005) showed that team heterogeneity is positive related with performance. In terms of heterogeneity as proportion of different job categories Magjuka and Baldwin (1991) found similar results as well. For personality traits Mohammad and Angell (2003) and Neuman et al. (1999) showed that team extraversion diversity affects performance positively. Neuman et al. (1999) found similar results for emotional stability.

Negative/No effects. Team diversity can also have negative or nonexistent effects on performance regarding the following literature findings. Amason et al. (2006) e.g. found that the increase of team heterogeneity leads to a decrease of new venture performance. Webber and Donahue (2001) found no relationship of demographic diversity with cohesion or performance. For race/ethnicity, gender, age, tenure, and education Jackson et al. (2003), Kirkman et al. (2001), Leonard et al. (2004), Li and Hambrick (2005), Mohammad and Angell (2003), Mohammad and Angell (2004), Pelled et al. (1999), Simons et al. (1999), Timmerman (2000), Townsend and Scott (2001), Watson et al. (1998) show that these diversity measures diminish processes, emergent states, and performance. Campion et al. (1993) also cannot find an effect of skill heterogeneity on performance of the team. For functional diversity Carpenter (2002), Jehn and Bezrukova (2004), Pelled et al. (1999), Pitcher and Smith (2001) cannot find a positive relationship with performance. Even more, it seems that functional diversity inhibits processes and effectiveness of the team (Knight et al. (1999), Pelled et al. (1999)), leads to reduced information sharing (Ancona and Caldwell (1992), and slower competetive response (Hambrick et al. (1996)). In case of personality traits their exist negative effects for diversity in extraversion (Mohammad and Angell (2004)) to processes and diversity in agreeableness and neuroticism to performance (Halfhill et al. (2005)).

University spin-offs. Their does not exist a lot of research especially for the effects of team diversity on performance for university spin-offs. In most cases, team diversity is measured in such human-capital terms as team members' previous industrial and management experience, with industrial experience serving as a key predictor of firm performance (Delmar and Shane (2006)). As some studies show, a founding team's industrial experience has no impact on the survival chances of university spin-offs, whereby the duration to stock market launch is shorter where founding team members have high levels of industrial experience (Shane and Stuart (2002)).

Entrepreneurial experience has no additional impact on new venture success (Shane and Stuart (2002), Nerkar and Shane (2003)). For other measures, too, such as age, religion and family background, the results are not robust in delivering positive or negative performance effects (Roberts (1991)). As mentioned above Ensley and Hmieleski (2005) show that team heterogeneity is positively related to performance for independent start-ups instead of university spin-offs.

As a whole, prior research results indicate that the interaction of team composition and outcomes is unclear. The effects of team composition depend on the input variables, the embedding context (Jackson et al. (2003)), time (how long teams stay together) (Harrison et al. (1998)), and organizational culture (Brickson (2000), Ely and Thomas (2001)). Apparently, team diversity is less important regarding direct effects and mediating mechanisms but it can be assumed that diversity could be much more important for critical success factors like the firm's network and financing possibilities. To wrap up this assumption a model that is explained in the following section is built.

4.1.3 Hypotheses Development

The created model includes four latent variables that are measured with 31 items (for a detailed explanation see section 4.1.4). These are *Team Diversity*, *Network*, *Finance*, and *Performance*. SEM and especially the PLS method is used and therefore the paths between the variables represent the hypotheses in the model. It is assumed that the variables *Network* and *Finance* are mediators for the effect of *Team Diversity* on *Performance*. The model is shown in Fig. 4.3.

To distinguish easily between direct and indirect effects the paths in Figure 4.3 are labeled with small latters (a, b, c, d, e, and f). The direct effects in the model are captured by hypotheses one to six respectively path a, b, c, d, e, and f. The indirect

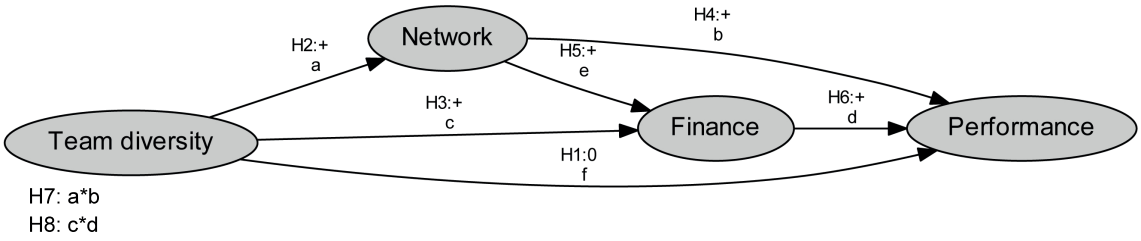

Figure 4.3. *Structural Model and Hypotheses*

effects can be analyzed by the hypotheses 7 and 8 or a*b and c*d. As introduced in section 4.1.2 there exist a controversial debate about the effectiveness of homo- or heterogeneous teams. Based upon oppositional findings and the two diametrically opposed theories of Byrne (1971) and Horwitz (2005) concerning team composition, the direct effect of team Composition on performance is expected to be zero. This assumption is picked up by hypothesis 1.

Hypothesis 1: Team diversity has no impact on firm performance.

Due to the network success hypothesis and social capital theory (Granovetter (1973), Brüderl and Preisendörfer (1998)) and the fact that networks (informal and formal networks) serve to embrace entrepreneurial opportunities (Baron and Tang (2009), Baron (2006), Ozgen and Baron (2007)) the firm's network is adressed as one of the most important success factors for new venture firms. Shane and Stuart (2002) e.g. postulated that direct and indirect contacts of the founding team with venture capitalists in their social network reduce the likelihood of failure. Furthermore, Grandi and Grimaldi (2003) show that the frequency of interaction with externals before founding the firm has an impact on the new venture's network and interaction frequency that boosts firm performance. Another reason why the firm's network serves as a major success factor is that the effect of social capital could be more important than teamwork capabilities (Brinckmann and Hoegl (2011)) and enhances performance (Vissa and Chacar (2009), Balkundi and Harrison (2006), Walter et al.

(2006)). Regarding the relevance of network ties and social capital in the mediation model it is applied that team diversity has a strong impact on the firm's network and in turn the firm's network has an impact on the access to resources and firm performance. Path a, respectively hypothesis 2 captures the impact of *Team Diversity* on the firm's network. It can be assumed that team diversity leads to a more diversified and greater network (e.g. Reagan et al. (2004), Burt (1992), Granovetter (1973)).

> *Hypothesis 2: A heterogeneous team composition has a positive impact on the firm's network.*

Hypothesis 3 respectively path b involves the impact of the firm's network on performance. A higher degree of different external networks that are less overlapping should provide more unique information inflows (e.g. Granovetter (1973), Reagan et al. (2004)) and lead to a larger pool of external adivsers, and more innovation (e.g. Hambrick (1994), Hansen (1999), Alexiev et al. (2010)) that in turn could lead to higher performance of the firm. As a whole, Vissa and Chacar (2009), Balkundi and Harrison (2006) and Walter et al. (2006) argue that a greater and more diversified network should permit more business activities and therefore enhances the firm's performance that lead to:

> *Hypothesis 3: The firm's network has a positive impact on performance.*

A positive impact of network ties on the access to financial resources is stated by e.g. Jarillo (1989), Birley (1986), and Starr and MacMillan (1990)). In a more recent critical review of networks in entrepreneurship literature Hoang and Antoncic (2003) show that a developed network could be an advantage for spin-offs or new venture firms to get access to financial resources. Furthermore, Brüderl and Preisendörfer (1998) and Zhao and Aram (1995) show as well that network ties could enhance

the access to financial resources. That leads to the hypothesis that the access to financial resources can be pushed by network ties:

Hypothesis 4: The firm's network has a positive impact on financial resources.

As regards to the resource-based view (Wernerfelt (1984)), the financial resources of new venture firms constitute the most CSF, whereby the firm's ability to attract financial resources is fundamental. H5 captures this effect:

Hypothesis 5: Financial resources have a positive impact on firm performance.

Corresponding to the pecking-order theory (Myers and Majluf (1984)), venture capitalists tend to invest in university spin-offs after the seed stage, and entrepreneurs prefer internal funding instead of external resources (Roberts (1991)). However, the financing of new ventures with venture capital is seen as the most important funding source for high-tech-based firms (Wright et al. (2006)). The literature on venture capitalism investigates how start-ups have to be evaluated and which evaluation criteria must be fulfilled to attain venture capital. One of the most important evaluation criteria concerns the entrepreneurial team (e.g. Silva (2004)). The most frequently mentioned team characteristics are industry experience, leadership experience, managerial skills, and engineering/technological skills that attract venture capital (Franke et al. (2008)). Human capital can serve as a signaling effect and therefore heterogeneous teams are preferred because of their functional diversity (Franke et al. (2008)). These findings lead to hypothesis H6:

Hypothesis 6: A heterogeneous team composition has a positive impact on financial resources.

As highlighted in section 4.1.2 many scholars from strategic management ignore possible mediating mechanisms that could explain the impact of team diversity on performance. As usual in organizational behavior research concerning team diversity and performance a mediation model is built that is able to investigate direct and indirect effects. It is supposed that the direct effect of team composition on firm performance is mediated by the firm's network and financial resources. In other words, team diversity affects the firm's network and the firm's financial resources that in turn affect the firm's performance. These indirect effects are captured by hypotheses 7 (a*b) and 8 (c*d).

Hypothesis 7: The direct effect of team diversity on firm performance is mediated by the firm's network.

Hypothesis 8: The direct effect of team diversity on firm performance is mediated by the firm's financial resources.

4.1.4 Research Methodology

Sample

The empirical study consists of 131 university spin-offs in the German and Swiss biotechnology sector, whereby 63 are founded by teams. A standardized questionnaire was used and sent to 900 university spin-offs in 2008 (return rate 15%). The survey includes 60 questions.

The information of 31 items is used to estimate the path coefficients. Each latent variable in the structural model (Fig. 4.3) is measured by a block of items (measurement models) that were asked for in the questionnaire. To measure team diversity, typical items discussed in the theoretical background section are used. These 10 items explain functional and demographic diversity as well as personal traits. The

latent variable finance is measured by asking for usual financing issues for new ventures and university spin-offs in particular. To display the firm's network and social capital of the team members adequately the latent network variable is measured by 12 items that consider formal and informal contacts whereby strong ties were focused. To regard the special university spin-off context with new ventures from the biotechnology sector the items were designed correspondingly. Based on the assumption from upper-echelon theory that firm performance is directly influenced by team effectiveness (e.g. Amason et al. (2006), Brinckmann and Hoegl (2011), Sine et al. (2006)) the performance variable is framed by usual items from management literature (Unger et al. (2011), Klotz et al. (2014)). Usually, there are used growth rates as in this study as well. Except the items for measuring the performance variable, five-point Likert-type scales are used for all other items, ranging from totally agree to totally disagree or for the team diversity construct ranging from totally homogeneous to totally heterogeneous. The items are shown in table 4.1. Descriptive statistics of the items are shown in table 4.2.

Partial Least Squares Model

Following Carpenter et al. (2004) structural equation modeling especially the PLS method is used (Wold (1966) and Wold (1974)) to test the hypotheses. Carpenter et al. (2004) e.g. argue that if the theoretical construct is top management team diversity more sophisticated methodologies like structural equation modeling should be used.

> "The advantage of such an approach is that measurement error becomes less of a factor and the odds of generating spurious results from single-item demographic variables is significantly reduced." (Carpenter et al. (2004), p. 772)

Survey items	
Team composition	
1. The diversity of the team members for:	Study programs and degrees
2. The diversity of the team members for:	Doctorates
3. The diversity of the team members for:	Other titles
4. The diversity of the team members for:	Soft skills (e.g. leadership)
5. The diversity of the team members for:	Contacts and network
6. The diversity of the team members for:	Industrial experience
7. The diversity of the team members for:	Age
8. The diversity of the team members for:	Character
9. The diversity of the team members for:	Nationality
10. Quantity of team members.	Team members
Finance	
1. To what extend the firm is funded by:	Bank
2. To what extend the firm is financed with:	Venture capital
3. To what extend the firm is funded by:	Vusiness angels
4. To what extend the firm is financed with:	Private equity
5. To what extend the firm is funded by:	Friends and family
6. To what extend the firm is financed with:	State funding and goverment aid
7. To what extend the firm is financed with:	European funding programs
Network	
1. Cooperation with:	Small and medium-sized enterprises
2. Cooperation with:	Industry
3. Cooperation with:	Universities
4. Cooperation with:	research centers
5. Cooperation with:	Connected researchers in universities
6. Cooperation with:	Connected researcher in research centers
7. Cooperation with:	International firms
8. To what extend the firm has:	Interdisciplinary cooperations
9. To what extend the firm has:	Short-term cooperations
10. To what extend the firm has:	Long-term cooperations
11. To what extend the firm use:	Informal contacts
12. To what extend the firm use:	University infrastructure
Performance	
1. Employee growth rate	Employee growth rate
2. Sales growth rate	Sales growth rate

Except the items for measuring the performance variable, five-point Likert-type scales are used for all other items.

Table 4.1. *Measured Items and Corresponding Labels*

Items	Mean	Standard deviation	VIF
study programs and degrees	2.59	1.377	1.612
doctorates	2.48	1.357	1.444
other titles	2.78	1.453	1.300
soft skills	3.45	1.083	1.567
contacts and network	3.48	1.168	1.770
industrial experience	3.38	1.148	1.642
age	2.58	1.499	1.256
character	3.25	1.069	2.659
nationality	2.08	1.238	1.680
team members	2.95	1.444	1.322
bank	2.59	1,488	1.688
venture capital	2.70	1.840	1.785
business angels	2.33	1.574	2.559
private equity	3.81	1.194	1.812
friends and family	2.36	1.441	2.995
state funding and government aid	2.16	1.087	1.546
european funding programs	1.56	0.710	1.967
small and medium sized enterprises	3.73	1.198	
industry	3.22	1.588	
universities	3.11	1.286	
research centers	3.22	1.362	
connected researchers in universities	3.41	1.205	
connected researchers in reserach centers	3.45	1.436	
international firms	3.72	1.278	
interdisciplinary cooperations	3.50	1.321	
short-time cooperations	2.64	1.146	
long-time cooperations	2.91	1.050	
informal contacts	3.38	1.485	
university infrastructure	3.08	1.313	
employee growth rate	2.0791	1.9540	
sales growth rate	189.3747	212.1975	

Table 4.2. *Descriptive Statistics of the Measured Items*

Further, the PLS method is used because it has proven capable of handling with small and medium-sized samples (Chin and Newsted (1999), Chin (1998b)) whereby already a sample size of 20 observations could be appropriate (Henseler et al. (2009)). As a heuristic rule Chin (1998b) recommend to multiply the highest number of measured items of one of the constructs in the model with 5 to get the minimum observations requirement for the data. Following this rule at least 10*5=50 observations are needed in the data so the analysis with 64 teams can be confirmed as satisfactory concerning sample size. Other reasons why PLS is chosen is the absence of distribution assumptions for the data (e.g. Lohmöller (1989)) and it is possible to test mediation directly in the model.

In general, the model shows the interaction among *Team Diversity*, *Finance* , *Network*, and *Performance* of the firm. These are the latent variables (see figure 4.3) representing the structural model. *Network*, *Finance*, and *Performance* are endogenous variables; *Team Diversity* is exogenous. The operationalization of these latent variables can be made by reflective and formative measurement models. Regarding that Petter et al. (2007) show that 30% of the measurement models in information system research are faulty, the use of formative or/and reflective measurement models should be evaluated carefully (for a detailed analysis see e.g. Bollen and Lennox (1991), MacCallum and Browne (1993), Edwards and Bagozzi (2000), Jarvis et al. (2003)). *Team Diversity* and *Finance* are measured in a reflective way, *Network* and *Performance* formatively. As an example the variable *Team Diversity* is considered in detail. This variable is operationalized by 10 items that measure the diversity of the observed teams in the data. Instead of an indexing approach that often lead to biased results the *Team Diversity* construct in the PLS model shows how the team diversity items influence the team diversity respectively a homo- or heterogeneous team composition. In contrast to reflective measurement models the formative indicators cause variance in the construct and can be individually evaluated based on their contribution to the construct (latent variable) analyzing their path weights and

their loadings (Cenfetelli and Bassellier (2009)). The novelty using this approach for measuring diversity effects is that the PLS model makes it possible to get information of different diversity items into the estimation minimizing the problem that the results are biased due to data that is measured on a aggregated level. Additionally, the effect as well as the absolute and relative importance of each diversity item can be analyzed.

4.1.5 Empirical Findings

The empirical results for the model estimated with the PLS method should be undertaken by a two-step analysis. First, the results for the formative measured team diversity construct are analyzed to get a more sophisticated view on the effects of the different team diversity items for the construct and the model. In other words it is possible to observe (a) the relative importance and (b) the absolute importance of the diversity items for the construct (e.g. Cenfetelli and Bassellier (2009)). Second, the path coefficients between the latent variables are examined to check out the hypotheses. According to Lohmöller (1989), they must be greater than 0.1 to constitute statistical evidence. Due to the lack of distribution assumptions in PLS models (e.g. Vinzi et al. (2010), Chin and Newsted (1999)), the statistical significance for the measurement model weights and path coefficients is tested with the bootstrapping method (Bollen and Stine (1992), Efron and Tibishirani (1993)).

Team Diversity Construct Results

Table 4.3 shows the results for the team diversity construct.

Item	path weight	t-value	loading
study programs and degrees	0.687	3.380***	0.4241
doctorates	-0.355	1.992*	0.0331
other titles	0.117	0.808	0.1018
soft skills	-0.282	1.404	-0.1805
contacts and network	0.922	0.159	0.1531
industrial experience	0.417	2.061*	0.4157
age	-0.525	2.601**	-0.3273
character	0.024	0.128	-0.2241
nationality	0.424	1.976*	0.3848
team members	-0.417	2.080*	-0.3117

Except the items for measuring the performance variable, five-point Likert-type scales are used for all items. The limits for statistical significance are: $t > 1.645 = p \leq 0.1$ +, $t > 1.960 = p \leq 0.05$ *, $t > 2.576 = p \leq 0.01$ **, $t > 3.291 = p \leq 0.001$ ***.

Table 4.3. *Team Diversity Construct Results*

6 of the 10 items of the team diversity construct are statistically significant on a 10% significance level. The items have positive as well as negative weights (standardized regression coefficients). A positive path weight stands for a positive impact on team diversity whereas a negative path weight implies a negative impact on team diversity. These results for the formative measured team diversity construct show that study programs and degrees, industrial experience, and nationality have a statistically positive impact on team diversity. The items doctorates, age, and team members have a negative impact on team diversity. This negative effects have to be discussed carefully. In a formative measurement model like in the case for team diversity the measured items are equal to predictors in a multiple regression. For the items age and doctorates do this mean that an increase of heterogeneity concerning age and doctorates leads to lower team diversity. At first glance this appears as an

inconsistent relationship. By a more detailed examination this relationships could be reasonable. Team members with different ages are more similar to each other than team members with equal ages. The probability for diverse human and social capital is higher if team members have a homogeneous age.

The variable doctorates has a negative path weight as well. One reason for negative weights in formative measured constructs could be that there exist suppressor effects (Cohen and Cohen (1983)). In this case one or more of the predictor variables explain variance in other predictor variables and so reduce or reverse the path weight of these predictor variables with the construct variable even if there are no great problems with multicollinearity (Cenfetelli and Bassellier (2009)). There are no indications for a supressor effect so the absolute importance of an indicator to its construct is analyzed with help of the zero-order correlation of the item with the construct (see loadings in table 4.3). The absolute importance of an indicator helps to identify how the item correlates with the construct value. The correlation for doctorates is nearly zero and therefore this item has no absolute importance for the construct. The relative importance measured by the negative path weight occurs if doctorates is estimated in the multiple regression controlling for all other predictors in the measurement model.

At least, the negative path weight of the quantity of team members seems to be surprising. A higher number of team members leads to a lower team diversity. This could make sense regarding a little example: A team with 2 team members has completely different soft skills. One of them is a professional in LaTeX the other knows well Microsoft Word. Then the two founders intend to expand their team with 2 more guys. Supposed, that the 2 new team members both are professionals in Microsoft Word as well as one of the originally team members the team diversity concerning soft skills decreases if the number of team members increases in this case. Obviously, this effect can be applied for other characteristics as well.

The team diversity construct results show how the different diversity items influence diversity in the model for university spin-offs in the biotechnology sector. Beside the statistically significant items for the diversity construct the nonsignificant items are interesting as well. There is no significant contribution to the diversity construct by the items other titles, soft skills, and character. The diversity of these items therefore have no relevance for the model.

Structural Model Results

The aim of the PLS estimation process is to maximize the correlation between the construct variables (*Team Diversity*, *Network*, *Finance*, and *Performance* whereby the construct values are framed by their formative or reflective measured items. The path coefficients and t-statistics for the structural model following the bootstrapping process are shown in Fig. 4.4. The entire results including the measurement models are shown in figure 4.5.

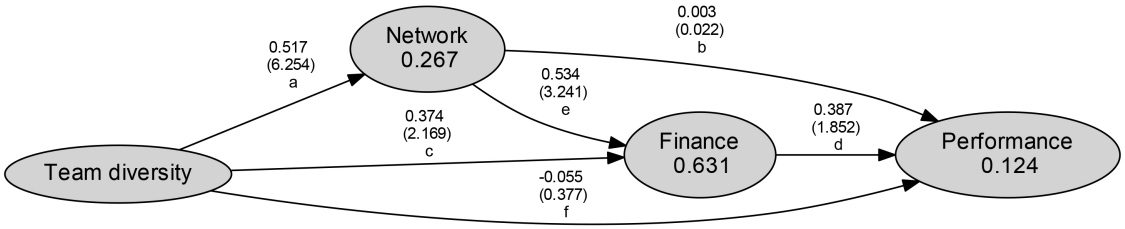

Figure 4.4. *Structural Model Results*

Each arrow includes (a) the path weight, (b) the t-value, and (c) the path label. The limits for statistical significance are: $t > 1.645 = p \leq 0.1, t > 1.960 = p \leq 0.05, t > 2.576 = p \leq 0.01, t > 3.291 = p \leq 0.001$ The nodes include the R^2-values.

As suggested from literature findings the impact of team diversity on firm performance is nearly zero. The path coefficient c takes the value -0.055 (0.364). Thus, a direct effect of team diversity respectively a heterogeneous team composition on performance cannot be observed. The direct effect from *Team Diversity* to *Network* (path a, H2) is highly statistically significant with a positive path coefficient (0.517 (6.346)). Therefore, the assumption that team diversity affects the firm's network positively can be confirmed. As expected there exist a positive impact of *Team Di-*

versity on *Finance* so H6 (0.374 (2.172)) can be confirmed. The access to financial resources is therefore influenced by team diversity within the data.

The impact of the firm's network in the model is captured by H3 and H4. There is a statistically significant positive impact of the firm's network on the access to financial resources (0.534 (3.264)). Thus, H4 can be confirmed. A greater network enhances the probability to get access to financial resources. The direct effect of network to firm performance captured by H3 cannot be confirmed (-0.003 (0.022)). This result is quite surprising regarding the network success hypothesis and social capital theory. There exists a positive impact of financial resources on firm performance (0.387 (1.850)). Thus, H5 (path d) can be confirmed at a 10% significance level. The access to financial resources leads to higher firm performance.

The results reveal two indirect effects. Instead of the assumed two mediation effects a*b and c*d only c*d can be observed as statistically significant mediation. Thus, H7 must be rejected and H8 can be confirmed. The second mediation that can be observed concerns the relationship between the firm's network and performance. This non-significant direct effect is mediated by *Finance*.

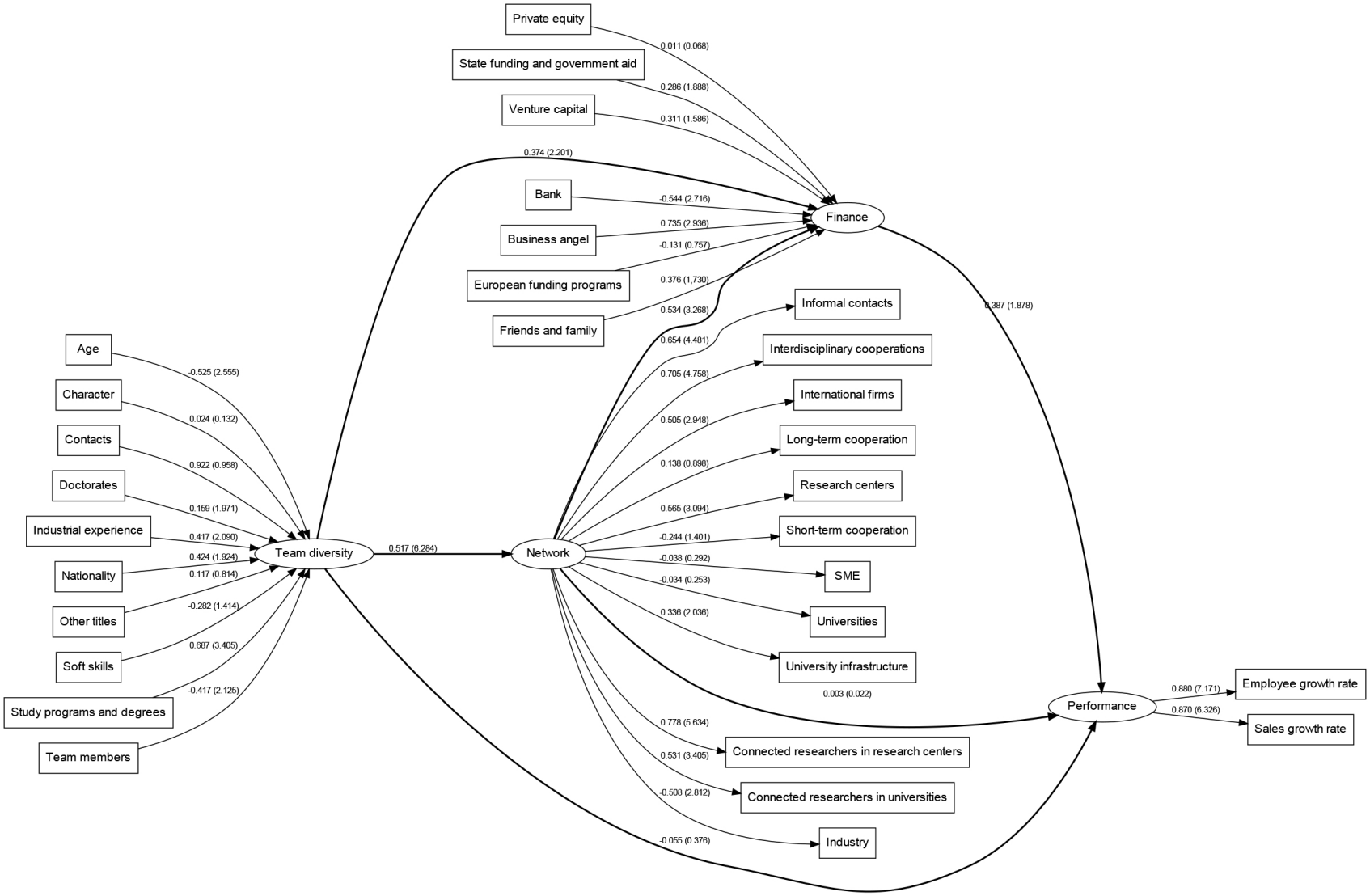

Figure 4.5. *Results Structural Model and Measurement Models*

Each arrow includes (a) the path weight, and (b) the t-value. The limits for statistical significance are: $t > 1.645 = p \leq 0.1, t > 1.960 = p \leq 0.05, t > 2.576 = p \leq 0.01, t > 3.291 = p \leq 0.001$

Model Evaluation

To check the validity of the approach, both the structural model and the measurement models will be evaluated. The quality of the structural model can be described by the parameters R^2, f^2 and Q^2. The R^2 statistic is well known from OLS regression and is calculated with the endogenous and exogenous variables as dependent and independent variables. Chin (1998b) identifies $R^2 \geq 0.67$ as substantial and $R^2 \geq 0.33$ and $R^2 \geq 0.19$ as an average result. To analyze the substantial impact of an exogenous variable on a endogenous variable, the effect intensity f^2 is used. According to Cohen (1988), $f^2 > 0.35$ describes a large intensity, $f^2 > 0.15$ a medium intensity, and $f^2 \geq 0.02$ a small intensity. Stone-Geisser's Q^2 is determined by a blindfolding process (Chin (1998b)) and evaluates the forecast relevance of the dependent variables in a structural model (Chin (1998b), Tenenhaus et al. (2005)). It should be greater than 0 (Fornell and Cha (1994)). The R^2, f^2 and Q^2 values are shown in Fig. 4.10.

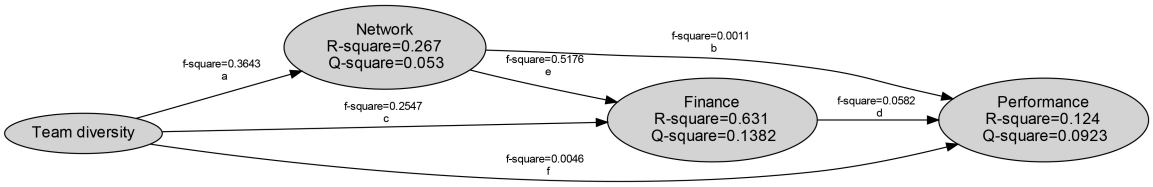

Figure 4.6. *Structural Model Evaluation*

With regard to the recommendations of Chin (1998b) the R^2 values for *Network* ($R^2 = 0.267$) and *Performance* ($R^2 = 0.124$) can be considered as an average result. These variables cannot have a greater R^2 value because the exogeneous variables obviously cannot explain the majority of the total variance of the endogeneous variables. The networks variance cannot be explained entirely by *Team Diversity*. By the same token, the performance variable cannot be explained perfectly by the firm's network, team diversity, and finance. The $R^2 = 0.631$ for *Finance* could be stated as substantial. Generally, a small R^2 value does not necessarily imply faulty model assumptions. Where the research field of success factors is concerned, small R^2 values

can be evaluated as substantial as well (e.g. Bauer (2002)). The $Q^2 > 0$ criterion is fulfilled for each variable. The strongest effects with respect to f^2 are observed for the impact of *Team Diversity* on *Network* (path a, $f^2 = 0.3643$) and *Finance* (path c, $f^2 = 0.2547$) and for the impact of *Network* on *Finance* (path e, $f^2 = 0.5176$). A small effect intensity could be observed for the impact of *Finance* on *Performance* (path d, $f^2 = 0.0582$). Consistent with the PLS coefficients, the impact of *Team Diversity* on *Performance* (path f, $f^2 = 0.0046$) and *Network* on *Performance* (path b, $f^2 = 0.0011$) carries the lowest influence in the model. The structural model quality criteria confirm that the structural model is valid, though a slight weakness due to the two average R^2-values in the model is inevitable.

Regarding the measurement models, there are two methods with which to determine the latent variables, namely a reflective and a formative one. For reflectively measured latent variables, the average variance extracted (AVE) (Fornell and Larcker (1981)) and the composite reliability (Chin (1998b)) are controlled. According to Chin (1998b) composite reliability should be greater than 0.6, and the AVE greater than 0.5. Furthermore, the factor loadings of the reflective measured variables should be greater than 0.707 if they are to make an explanatory contribution to the latent variable (e.g. Johnson et al. (2006)). For formatively measured latent variables, multicollinearity has to be tested. Thus, the correlations between the measured variables and the variance inflation factor (VIF) of the team diversity and finance items are analyzed. Henseler et al. (2009) consider VIF values greater than 10 as critical whereas Diamantopoulos et al. (2008) see already multicollinearity problems for VIF values greater 5. The VIF values for the items of the two formative measured constructs in the model do not exceed 2.9 so there are no difficulties with multicollinearity. The results are shown in table 4.2.

Table 4.4 shows the AVE, composite reliability, and factor loadings for the refelective measured constructs. These results are mainly satisfactory and permit the use of

the reflective measurement models, even though the AVE criterion is not fulfilled for *Network* due to the weak explanation contribution of some measured variables. These affected variables were not omitted so as not to interrupt the evidence of the entire model, and an omission would be contrary to the theoretical background. The factor loadings of the items for the network construct do not always achieve the minimum requirement. The PLS model allows omission of items in reflective measured constructs if their loadings are not high enough to increase the validity of the construct. Once more, these items were not omitted as they relate to the theoretical assumptions. As a whole, the created model can be stated as valid.

Condition:	Factor loadings ≥ 0.707	AVE ≥ 0.5	Composite reliability ≥ 0.6
Network		0.2367	0.5563
SME	-0.038		
industry	-0.508		
universities	-0.034		
research centers	0.565		
connected researchers in universities	0.531		
connected researcher in research centers	0.778		
international firms	0.505		
interdisciplinary cooperations	0.705		
short-term cooperations	-0.244		
long-term cooperations	0.138		
informal contacts	0.654		
university infrastructure	0.336		
Performance		0.7662	0.8676
employee growth rate	0.880		
sales growth rate	0.870		

Table 4.4. *AVE, Composite Reliability, and Factor Loadings*

4.1.6 Discussion and Limitations

The results in this study address different aspects in organizational behavior and entrepreneurship literature concerning the impact of team diversity on performance and important success factors. There are some interesting insights that are helpful to understand better the effects of diversity in teams. The selection of an adequate statistical method is crucial for this new insights regarding the subject of team diversity (Barrick et al. (1998)). The PLS method makes it possible to observe a bunch of diversity items in one model minimizing the probability of biased results (Carpenter et al. (2004)). Furthermore, it is possible to look at the importance of different diversity items and to analyze mediation effects directly. Regarding, that the PLS algorithm maximizes the correlation of the construct variables in the model that are framed by their measured items it is possible to investigate how diversity interacts with network, access to financial resources, and performance of the firm.

Direct Effects

Prior literature findings are ambiguous concerning the direct effect of team diversity on firm performance (e.g. Ensley and Hmieleski (2005), Amason et al. (2006), Webber and Donahue (2001)) and the model points out again that the investigation of a direct effect is not sufficient to analyze the effect of team diversity on performance. Thus, more sophisticated models are necessary to open the black box of team diversity effects (Carpenter et al. (2004), Mathieu et al. (2008), Klotz et al. (2014)) and this study adds empirical evidence to this debate. Before analyzing the indirect effects the results for the remaining direct effects in the model will be discussed. The statistically positive effect of team diversity on the access to financial resources shows that team diversity can be a positive signal for investors. This result is in line with VC literature (e.g. Beckman et al. (2007), Zimmerman (2008), Franke et al. (2008)) that show that functional diversity attracts investors. Furthermore,

a positive impact of team diversity on network can be measured. This relationship is not surprising regarding network theory (e.g. Burt (1992), Granovetter (1973)). The positive and highly statistical significant impact of the firm's network on the access to financial resources shows that network ties are of high relevance to get financed and this result confirms previous scholars concerning the interaction of network and financial resources (e.g. Hoang and Antoncic (2003), Zhao and Aram (1995)). Another direct effect is captured by the relationship between network and performance. A positive relationship was assumed as a greater network should increase productivity and performance (e.g. Reagans and Zuckerman (2001)) but the results reveal no significant impact of network on performance. The effects of the network variable show that university spin-offs in the high-tech sector should have a great diversified network to get a better access to financial resources that are vital but this network does not influence performance directly measured by employee and sales growth. This result limits the network success hypothesis for university spin-offs in the biotechnology sector. Unsurprisingly, the impact of financial resources on performance is positive and confirms the importance of financial resources of the firm (Wernerfelt (1984)).

Indirect Effects

The upper-echelon approach (Hambrick and Mason (1984)) states that team effectiveness leads directly to firm outcomes. The results are in line with organizational behavior and entrepreneurship literature that suggest a more complex relationship between team diversity and outcomes so it seems reasonable to test team diversity effects in mediation models. As mentioned above team diversity does not affect firm performance directly. But, is there no impact of team diversity on performance? To answer this question for mediation was tested two mediation effects were identified in the model. One of these is the mediation of the relationship between team diversity and performance by financial resources. Team diversity has a positive impact on the

access to financial resources that in turn has a positive impact on performance. This result emphasizes the importance of team diversity. Even if the impact of team diversity on performance is controversial in literature findings the indirect effects that are caused by team diversity are of high relevance for firm performance. The second mediation concerns the relationship between network and firm performance that is mediated by finance. The analysis of the indirect effects show that team diversity has a positive indirect impact on firm performance and the relevance of the firm's network and social capital must be emphasized. The results can be queued to the work of Brinckmann and Hoegl (2011), Vissa and Chacar (2009), Balkundi and Harrison (2006), Walter et al. (2006) who consider the firm's network and social capital as one of the most important success factors. In the model the network ties are of high relevance for the access to financial resources and therefore as well for firm performance. These results show that team diversity could be positive for firm success and therefore it can be proposed that a heterogeneous team composition is favorable for university spin-offs regarding the interaction of network ties and the access to financial resources.

Team Diversity Construct Results

The PLS method makes it possible to analyze the importance of the diversity items simultaneously in the model. The diversity of the teams measured by the items study programs and degrees, doctorates, industrial experience, age, nationality, and quantity of team members have a significant impact in the model whereby the items other titles, soft skills, contacts, and character have no significant impact. Keeping in mind, that the interaction of team diversity, network, finance, and performance of university spin-offs in the biotechnology sector is observed the team diversity construct results show that diversity of the here called "soft characteristics" of the team do not play a significant role for these variables. These characteristics are difficult to observe for investors and could be secondary for network building and

maintaining network ties. In this sense, it appears that for university spin-offs diversity in "hard characteristics" of the team have a significant influence on critical success factors of the firm and performance. Furthermore it can be shown, that age heterogeneity reduces the overall diversity of the team. This insight is rather new and shows that work groups with team members with equal ages are more diverse than work groups with team members with different ages for university spin-offs. The same can be observed for the quantity of team members. Teams with a high number of team members are more homogeneous than work groups with less team members. These results indicate that age heterogeneity and the quantity of team members should be used carefully as a proxy for team diversity in single item or simple index measures if diversity is measured by usual diversity items. It must be distinguished here between age and team size as single proxies for success (e.g. Kilduff et al. (2000), Eisenhardt and Schoonhoven (1990)) and age and team size as items that are a component of a team diversity construct. The question that occurs here is if investors or network partners evaluate this situation equally. In other words, do investors or network partners realize team diversity as a whole construct or do they concentrate on selected diversity items to evaluate diversity of the team. This question cannot be answered at this point but the study shows that team size and age diversity could stand for a homogenous team composition and therefore emphasize the use of more complex statistical methods to analyze diversity effects. The use of the PLS method and the analysis of the team diversity construct makes it possible to detect relationships of different diversity items in an entire model and minimizes the probability of biased results.

Limitations

The present study underlies several limitations. Data from university spin-offs in the life science industry is used. This special context could have an influence on the research results and reduce the generalization of the research results for teams in

other contexts. However, regarding prior research concerning team diversity the use of data from high-tech firms appears usual. The study shows how context-sensitive diversity research could be and emphasizes the use of sophisticated statistical methods to open the black box of diversity research a little bit more. Another limitation concerns the concentration on the most crucial success factors whereby a more complex model including other important success factors of the firm could lead to more convincing results.

4.2 Pay for Performance versus Nonfinancial Incentives in Small and Medium-Sized Enterprises

After the research study concerning team diversity for university spin-offs in the past section the focus is shifted away from original ventures to SMEs. According to the research framework (see figure 4.1) now the second stage in the life-cycle is emphasized. This stage is characterized mainly by firm growth and thus other success factors in comparison to the first stage gain more significance. Success factors concerning the organizational imprinting hypothesis (Stinchcombe (1965)) e.g. are replaced by success factors in the area of strategic management.

One of the most important success factors for entrepreneurs and business owners concern human resource management (HRM) as part of strategic management (e.g. Longenecker et al. (2012), Hornsby and Kuratko (2003), Carlson et al. (2006), Cassell et al. (2002); Barrett and Mayson (2007)). Therefore, the recruitment and maintaining of qualified and motivated employees is crucial for organizational performance. Especially, the use of incentive systems or specific compensation schemes can be an appropriate way to attract and satisfy the firms' staff (Milkovich et al. (2011), Carlson et al. (2006), Behrends (2007)). The use of incentive systems or pay for performance schemes has become a standard tool in human resource management within the past three decades (e.g. Rost and Osterloh (2009)). In comparison to big companies, however, SMEs suffer from several disadvantages (Hannan and Freeman (1984)) that complicate the use of compensation schemes (Behrends (2007), Behrends and Martin (2006)) and impair the position of SMEs in the war of talents. The greatest disadvantage is SMEs lack of resources and managerial know-how that is necessary to realize and implement HRM strategies (Milkovich et al. (2011)).

Given this information the question arises if the use of incentives really could be a specific success factor for SMEs. Apart from a few exceptions (Behrends (2007), Behrends and Martin (2006)) there exists no empirical research that determines which incentives SMEs should use to affect organizational performance. This thesis presents empirical evidence for the effects of financial and nonfinancial incentives on employee motivation and therefore success and thus closes a research gap. The results provide guidelines for SME business owners and entrepreneurs to reward their employees in the best way possible.

4.2.1 Introduction

The effectiveness of PFP in organizations is not as clear as it might appear and as is often proclaimed. Psychology-economics research has found that PFP can also have no or even negative effects for organizations (Frey and Osterloh (2002)). The main reasons for such negative effects are the crowding-out of intrinsic motivation (Frey and Jegen (2001), Frey and Oberholzer-Gee (1997)) and inadequate implementation of PFP systems (Milkovich et al. (2011)). Intrinsic motivation, which is stimulated by the perceived autonomy and self-determination of an employee, is an important factor of success for most companies (Frey and Osterloh (2000), Deci and Ryan (1985), Gagné and Deci (2005)). Consequently, a crowding-out of intrinsic motivation can harm the organization if it exceeds the incentive effect induced by PFP.

For the analysis of PFP in SMEs, the unique SME characteristics have to be recognized. These are primarily a more individual-oriented social environment, a lower complexity in contrast to big companies, and a lack of resources (Behrends (2007), De Kok et al. (2006)). The lack of resources describes minor materialistic, personnel and time resources in comparison to bigger companies explained by the resource-based view (Wernerfelt (1984), Barney (1991), Grant (1991)) and the resource-based

view in a personnel perspective (Colbert (2004), Wright et al. (2001), Lado and Wilson (1994)). Because of these characteristics and the fact that PFP was originally applied to workers at the assembly lines of big companies (e.g. Lazear (1986)), the positive effect of PFP in SMEs appears questionable. At first glance, a lack of resources may be the obvious reason for SMEs difficulties in realizing PFP in the workplace: Lack of financial resources limits the possibility of setting up and maintaining a sophisticated PFP system, and lack of know-how impedes its implementation.

However, the situation is more complex for SMEs. The study shows that SMEs can offer their employees a different kind of workplace than big companies, with different incentives that can used to reward employees adequately. Furthermore, incentives of this kind can create a competitive advantage for the organization. E.g. Werner (2004) and Werner and Moog (2007) show that a general favorability with respect to the quality of the offered jobs of big companies compared to SMEs (Wagner (1997)) at least has to be questioned. How is this possible? As SME employees value their individual working latitude and a low degree of control, SMEs have to push intrinsic motivation in order to enhance the working effort spent by the employees. This is possible with a developed social environment, and the use of nonfinancial incentives. The results show that intrinsic motivation, social environment and nonfinancial incentives are key factors for rewarding SME employees. These key factors are strongly connected and are able to create an equilibrium between the employees‘ efforts and their needs (see also March and Simon (1993)). Moreover, they tend to generate employee satisfactions and thus may outweigh the use of extrinsic rewards.

Nonetheless, in addition to rewarding employees with nonfinancial incentives and creating and maintaining a unique workplace, SMEs also do use PFP. The empirical results show that PFP is well-established in German SMEs. More than half of the companies in the study use variable pay to remunerate their employees, although

according to the psychology literature mentioned above, the use of PFP might be hazardous in terms of crowding-out intrinsic motivation. A small but significant crowding-out of intrinsic motivation can be found in the study that allows two possible conclusions. First, intrinsic motivation may be crowded out in a way or to a degree that might harm the organization, or, second, the unique SME environment offsets the crowding-out effect because it might be easier for SMEs to fulfill the requirements for a good PFP system. This study thus adds empirical evidence to the ongoing debate on whether PFP is able to achieve the prescribed goals of motivating employees to more productivity and outcome (incentive effect) and to improve the attractiveness of the organization (sorting effect), with special emphasis on the SME environment.

4.2.2 Theoretical Background

Pay for Individual Performance and Group Performance

Before beginning the analysis, the term PFP must be clearly defined. Generally, pay for performance can be described as variable pay. The variabilization of the fixed salary is used to link pay and performance. Fixed salary components are replaced by a variable proportion which is coupled to the success of the employee or the organisation. Such a variabilization aims to make labor costs more flexible, increase employee motivation, performance and commitment, reduce agency costs, and increase competitiveness on the labor market (Milkovich et al. (2011), Gerhart and Rynes (2003), Gerhart et al. (2009)). The replacement of the fixed salary by variable components lets the employees participate in the risk of the enterprise. This risk take-over is remunerated by a risk bonus, so the employee is able to earn more than without variabilization. There are two main effects of PFP. The first is the incentive effect, which motivates employees to more productivity and outcome. The second is the sorting effect (Gerhart et al. (2009), Lazear (2000), Gerhart and

Rynes (2003), Rynes et al. (2005)), which tends to attract top-performers on the labor market and to induce poor-performers to leave the organization. Different compensation and incentive systems lead to a selection among the employees. There is evidence that high performers favor PFP (e.g. Trank et al. (2002) and financial rewards (Trevor et al. (1997)) whereas low performers choose a workplace without a tight performance-pay-relationship (Harrison et al. (1996)).

PFP must be divided into pay for individual performance and pay for group performance. Pay for individual performance is known as merit pay, lump-sum bonuses, and individual incentives. Pay for group performance includes gain-sharing plans, profit-sharing plans and stock options. Following Fang and Gerhart (2012), the study concentrates on PFIP because it is predominantly utilized as variable pay (Milkovich et al. (2011)).

Financial and Nonfinancial Incentives

Incentive systems are used to align employee behavior, effort, and motivation with the company goals (for a detailed explanation see Lazear (1998), Baron and Kreps (1999), Milkovich et al. (2011)). The utilized incentives can be categorized into financial and nonfinancial incentives. Merit pay, lump-sum bonuses, and individual incentives (PFIP) represent the financial incentives. Besides these financial incentives, there also exist nonfinancial incentives. These are, e.g., recognition and status, employment security, challenging work and opportunities to learn (Milkovich et al. (2011)). According to Becker and Kramarsch (2007), nonfinancial incentives can be assigned to one of the four categories: Social incentives, organizational environment incentives, work-itself incentives, and career incentives. Financial and nonfinancial incentives are of high relevance for employee motivation, productivity and selection. The effects and importance of these incentives for SMEs are analyzed in this study.

Extrinsic and Intrinsic Motivation

Motivation can be extrinsic or intrinsic. In general, extrinsic motivation targets the outcome of an action, detached from its execution—only the outcome leads to satisfaction. Intrinsic motivation on the other hand describes satisfaction while doing the job—the task itself produces satisfaction (Calder and Staw (1975), Ryan and Deci (2000)).

A classic example for extrinsic motivation and its results is shown by Lazear (2000), who describes a productivity increase of 44% by a glass installation firm as the result of PFIP. Also Locke et al. (1980) document an average productivity increase of 30% after establishing PFIP. Gerhart and Milkovich (1990) explored 200 enterprises and observed an average ROA increase of 1.5% yearly for an increase of 10% in bonus payments. Heneman (2002), Heneman (1992), McDonald and Smith (1995), and Jenkins et al. (1998) found similar results in their studies and confirm the positive effect of PFIP on outcome and productivity.

Unlike extrinsic motivation, intrinsically motivated activities are done for their own sake. Deci and Ryan specified the base components of intrinsic motivation in their cognitive evaluation theory (Deci and Ryan (1985), Gagné and Deci (2005)). The main sources of intrinsic motivation are perceived competence and perceived self-determination. External activities such as financial or nonfinancial incentives affect an employee‘s perceived competence and perceived self-determination, either positively or negatively. Recognition of good work, e.g., can be stated as informative and satisfies the needs for competence and self-determination, resulting in a positive effect on intrinsic motivation. Negative effects occur if the external activities are perceived as control. Examples are deadlines (Amabile et al. (1976)), monitoring (Lepper and Greene (1975)), or target agreements, which are typical for PFIP contracts. The demotivating effects of these are different for each person (Deci and

Ryan (1985)). Deadlines, e.g., may be perceived as either control or as a stimulation to perform better, depending on the individual attitude.

The impact of extrinsic rewards on intrinsic motivation is heavily discussed. Deci (1971) already recognized that extrinsic rewards are able to increase performance but can also crowd-out intrinsic motivation. This process is called the crowding-out effect (Frey (1997), Frey and Jegen (2001), Deci et al. (1999)). The crowding-out effect consists of three partial effects, the spill-over, the over-justification, and the multi-tasking effect. The spill-over effect describes that rewarding a certain task leads to the wish for rewarding other tasks as well (Frey and Osterloh (1997), Frey and Benz (2001)). The over-justification effect explains the decrease of intrinsic motivation of intrinsically motivated persons if they are externally controlled by extrinsic rewards (Deci (1975), Frey and Oberholzer-Gee (1997), Deci et al. (1999), Deci et al. (1999)). The multi-tasking effect explains strategic behavior of the rewarded employees by neglecting not rewarded tasks (Holmström and Milgrom (1991), Backes-Gellner et al. (2001)).

Standard economic models normally do not distinguish the discussed motivation types (Frey and Jegen (2001)). Either the crowding-out effect is totally neglected, or an additive connection between intrinsic and extrinsic motivation is assumed (Notz (1975)). Recent studies also identify a positive impact of PFIP on intrinsic motivation under common workplace conditions (Fang and Gerhart (2012)). Fang and Gerhart e.g. argue that there is little workplace-based evidence for a negative impact of PFIP on intrinsic motivation. The crowding-out effect is primarily proven in laboratory experiments. They examine a positive effect of PFIP on intrinsic motivation in their study. One reason therefore may have been a strong sorting effect so that the majority of the survey participants preferred extrinsic rewards.

Furthermore, most empirical studies describe the implementation of PFIP for the entire firm and must be distinguished from studies that focus primarily on exec-

utives (e.g. Milkovich et al. (2011)). Employees that work at the assembly line or in the production process have different requirements and different needs than executives and can be motivated much easier with financial incentives because their working conditions are less creative and in general provide a smaller working latitude. The performance increase of the glass installation firm cited at the beginning of the chapter (Lazear (2000)) is the best example for one-dimensional activities that can be rewarded by financial incentives without a risk of a crowding-out of intrinsic motivation. For this kind of working activities the positive effects of PFP are unambiguous (e.g. Lazear (1999)), in contrast to the effects of PFP for executives and skilled workers. The study only concentrates on executives and skilled worker.

Why is intrinsic motivation so important, especially for SMEs? Generally, there exist three main reasons why productive companies (regardless of their size) need intrinsically motivated employees (Frey and Osterloh (2000)). The first concerns the common pool resources of the company (Thompson (1976), Frese (1998)). The company has a pool of resources that inlcude cumulative knowledge, relationships, and material resources that are available for all employees. Non-intrinsically motivated employees could easily waste or misuse this common resource pool for their own advantage and impair the company. The second reason for the need for intrinsic motivated employees is tacit knowledge (Osterloh and Frey (2000)). This knowledge is unwritten and cannot be captured in words, so it must be shared between cooperative employees (Polanyi (1985), Grant (1996)). Companies depend on tacit knowledge and employees that pass this knowledge to other employees (e.g. Teece (1998)). Lack of intrinsic motivation would harm the information exchange within the company and therefore the company itself (Osterloh and Frey (2000)). The risk of a drying-out information exchange in SMEs seems to be more hazardous for SMEs than for bigger companies, regarding that SMEs usually do not have a sophisticated knowledge management system and more strongly depend on key employees that share their knowledge. The third reason is innovation and creativity. These prop-

erties mostly depend on intrinsic motivation (Amabile (1996), Schwartz (1990)), while extrinsic motivation encourages employees do things in the accustomed way and promotes a superficial way of working (Deci and Flaste (1995)). As innovative capacity and creativity is crucial for SMEs (e.g. Rosenbusch et al. (2011)), intrinsically motivated employees are essential. Losing intrinsic motivation can thus carry hidden costs that might be greater than the positive results of the incentive effect and the sorting effect from extrinsic rewards, especially for SMEs.

SMEs and the Labor Market

Because of their size, SMEs have several characteristics that can be advantageous or disadvantageous compared to big companies. The main difference between SMEs and big companies is the lack of resources, resulting in less competitive salaries and thus a potential disadvantage on the labor market (Behrends (2007), Wernerfelt (1984), Barney (1991), Grant (1991)). In 2004, The German Federal Office of Statistics stated an average income difference of up to 1000 Euros per month between employees in small and big companies. In addition to potentially tighter financial limitations for the use of extrinsic rewards, there are two more specific, interconnected, SMEs characteristics: Social environment and complexity (Behrends (2007)). The social environment in SMEs can be characterized by a better social interaction between the employees in contrast to big companies (Barrett (1999), Ram (1999), Matlay (1999), Ritchie (1993)). Good personal relationships and friendships across different hierarchy levels are typical for SMEs and lead to more teamwork, problem-solving ability, and faster decision processes (Longenecker et al. (2012)). Personal contact with executives and the company owner can increase employee commitment (Behrends and Martin (2006)). Additionally, employees can better recognize their individual contribution to the company‘s performance, leading to a greater recognition of their work. This special social environment is common for SMEs though its level differs, of course, from firm to firm depending on the cor-

porate culture. Typically, a more intimate social environment is negatively related to complexity, which can be measured by the number of hierarchic structures, bureaucratic rules, and departments (Ford and Slocum (1977), Daft and Bradshaw (1980)).

Paying attention to the resource-based view (Wernerfelt (1984), Barney (1991), Grant (1991)), SMEs need qualified and motivated employees to sustain the competitiveness and success of their firm. Due to the demographic and economic development of Germany, there is a shortage of talent, especially for the needs of SMEs (Kay and Richter (2010)). SMEs' lack of resources, lower prominence on the labor market, and predominantly rural company locations represent several disadvantages for setting incentives in contrast to big companies. According to the sorting effect (see Section 4.2.2), these disadvantages should result in severe problems for SMEs in acquiring highly skilled workers and in a loss of productivity and competitiveness.

There is evidence, however, that SMEs are able to perform well or even better than big companies (Simon (2009), Simon (1992)) and that they attract well-performing employees, so the incentives they offer must be satisfactory for the employees and capable to compensate extrinsic rewards (Behrends (2007)). Even more, the compensation and workplace package in SMEs could lead to a competitive advantage at the labor market in contrast to big companies. The unique SME characteristics of social environment and reduced complexity as compared to big companies can have a positive impact on nonfinancial incentives and can enhance the perceived self-determination and competence which are the main drivers for intrinsic motivation.

With regard to PFIP, SME employees who have deliberately sought the kind of workplace SMEs typically offer may experience PFIP as control and prefer to avoid PFIP in order to maximize their working latitude. On average, they should have different values than employees in big companies and appreciate the special conditions

offered by SMEs (Longenecker et al. (2012), Resto et al. (2007)). This conclusion is mainly valid for executives and skilled workers in contrast to workers at the assembly line that favor PFIP. For these employees, money may be not the crucial incentive. Hence, there is a kind of sorting effect that is unique for SMEs and appears mostly for persons that have high needs for self-determination and competence. Their priorities in average are different compared to literature findings concerning the selection effect (see Section 4.2.2). Therefore, intrinsic motivation can be considered as a key factor for SMEs.

As a consequence, PFIP may be expected to have a negative impact for SMEs. However, the impact depends on the existence and strength of the crowding-out effect and the possibility of compensating financial incentives with nonfinancial ones. SMEs need incentives, financial or nonfinancial, to motivate and hold their employees. The crowding-out effect differs for each person and also depends on the PFIP system design. There are a number of conditions that must be fulfilled so that PFIP can achieve its goal (Milkovich et al. (2011)). Among these conditions are objectivity, measurability of the employee performance, transparency of the incentive system design, acceptance, and controllability (Atkinson et al. (2011)). As the premise that extrinsic rewards can be compensated by nonfinancial incentives has not been empirically verified so far (Behrends (2007), Werner (2004), Wagner (1997)), PFIP could also be favorable for SMEs.

4.2.3 Hypotheses Development

The use of nonfinancial incentives and the unique SME characteristics of social environment and reduced complexity are capable of creating a special environment that can boost intrinsic motivation (see also Hackman and Lawler (1971), Hackman and Oldham (1976)). It is assumed that amount of executives and high skill workers favor the SME workplace conditions and that this package could compensate for

extrinsic rewards and leads to a sorting effect that affects intrinsically motivated employees with high needs for self-determination and autonomy to work and stay in SMEs. Consequently, financial incentives play a minor role in SMEs if the fixed salary is already fair. To analyze this relationship, a structural model is applied to link financial and nonfinancial incentives, firm complexity and social environment, and intrinsic motivation. The path model illustrates a first integral approach and does not claim completeness. Up to date, the interaction between SME characteristics, financial and nonfinancial incentives, and their effects has not previously been examined. Figure 4.7 shows the proposed relationships and the model variables. The paths in the structural model represent the hypotheses.

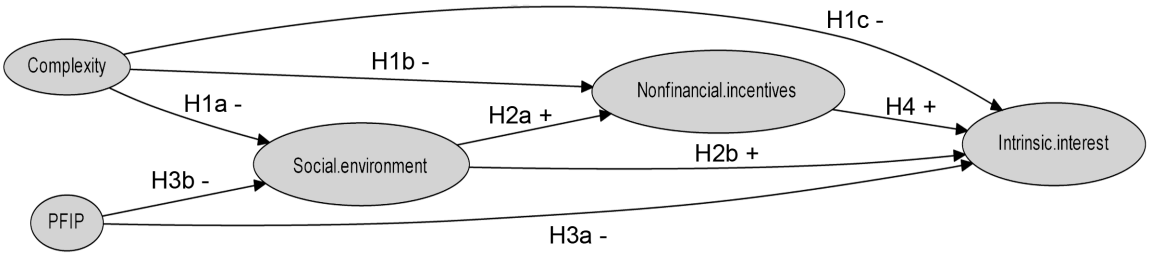

Figure 4.7. *Structural Model, Relationship between Incentives, SME Characteristics, and Intrinsic Motivation*

The effects of complexity on social environment, nonfinancial incentives, and intrinsic motivation represent Hypothesis 1. These effects include the assumption that a rising complexity changes the structural requirements of the organization and therefore causes less social interaction, complicates the possibility to realize nonfinancial incentives, and reduces intrinsic motivation due to decreasing self-determination and autonomy:

> *H1a: Complexity has a negative impact on the social environment within the firm.*
>
> *H1b: Complexity has a negative impact on nonfinancial incentives.*
>
> *H1c: Complexity has a negative impact on intrinsic motivation.*

Further is presumed that the social environment and social interaction have positive effects on nonfinancial incentives and intrinsic motivation. A developed social environment enforces the possibility to set nonfinancial incentives (social incentives, career incentives, organizational environment incentives, work incentives) and leads to higher self-determination and autonomy that push intrinsic motivation:

H2a: Social environment has a positive impact on nonfinancial incentives.

H2b: Social environment has a positive impact on intrinsic motivation.

According to the crowding-out effect, financial incentives may have negative effects on intrinsic motivation. These negative effects mainly occur when financial incentives are given for activities that were intrinsically motivated before and when PFIP diminish self-determination and autonomy. Two effects of PFIP are analyzed: First, the crowding-out of intrinsic motivation by PFIP:

H3a: PFIP has a negative impact on intrinsic motivation.

And second, the negative impact on social environment due to focusing on individual performance and higher competition between the employees:

H3b: PFIP has a negative impact on the social environment.

The last hypothesis describes the effect of nonfinancial incentives on intrinsic motivation. It is hypothesized that nonfinancial incentives drive intrinsic motivation because they promote self-determination and autonomy.

H4: Nonfinancial incentives have a positive impact on intrinsic motivation.

4.2.4 Empirical Study Design

Partial Least Squares Model

For testing the hypotheses within the structural model, the PLS method is chosen proposed by Wold (1966). The model shows the interaction between financial incentives on the individual level, nonfinancial incentives, SME characteristics, and intrinsic motivation. The partial least squares method is the adequate approach for testing this kind of hypothesis system because it is data- and forecast-oriented, which is often associated with soft modeling. It is used to confirm hypotheses that are not empirically verified yet (Vinzi et al. (2010)). Another reason for the use of PLS is that this approach has proven able to cope with small and medium-sized samples (Chin and Newsted (1999)).

Measured Items

The latent variables in Figure 4.7 represent the structural model. Intrinsic motivation, nonfinancial incentives, and social environment are endogenous variables. Complexity and PFIP are exogenous. All variables are latent and operationalized by measured items which can be found in table 4.5. For the measured items five-point Likert scales, ranging from totally agree to totally disagree are used. Intrinsic motivation is measured as intrinsic interest, an approach which is common in the literature (Cameron and Pierce (1994), Eisenberger and Cameron (1996)). The items for intrinsic interest are taken from the Minnesota Satisfaction Questionnaire (Weiss et al. (1967)). The internal consistency reliability estimate (Cronbach's α) was 0.92 in the data set. The latent variable nonfinancial incentives is measured by 8 items according to Becker and Kramarsch (2007) with an α of 0.78. The items for social environment achieve an α of 0.8. For measuring PFIP, the items from Gomez-Mejia and Balkin (1992) were adopted. Using the six items they propose, Cronbach's α only amounts to 0.51, so one item was omitted for a better internal

consistency reliability. After this step the value for Cronbach's α for the PFIP measure is 0.63. Complexity is measured by the four items number of departments, number of hierarchy levels, employees, and number of commercial units ($\alpha = 0.69$).

Sample

Master students were asked at a medium-sized German state university to share the survey in their personal environment. They had to share the survey to employees in their social network that work as executives or skilled workers. The survey includes 24 questions with 68 variables. A total of 254 analyzable questionnaires were gathered. This form to collect the data was used to get a well diversified sample, as participating master students come from all regions in Germany and in average have a large social network and amount of business contacts so the requirement for a randomized sample is fulfilled and the likelihood to get usable data is very high. This approach in collecting data was adopted from Behrends (2007). The original sample covers a broad range of employee professions, industrial sectors, and firm sizes, also including large companies. The sample is restricted to SMEs according to the definition of the German Institute for SME Research, that is, firms with a maximum of 500 employees. Additionally, the study only concentrates on executives and skilled workers (for a detailed explanation see Section 4.2.2). These restrictions leave 169 questionnaires. Information about company size and industrial sectors can be found in table 4.6.

4.2.5 Empirical Findings

Descriptive Statistics

The use of PFP plans in small and medium sized enterprises is displayed in table 4.7. These plans include PFIP, pay for group performance, and stock ownership plans, whereas a considerable number of firms do not use PFP at all. The figures

Survey items	
Nonfinancial incentives	
Social incentives	
1. My workplace allows a good work-life balance.	work.life.balance
2. I experience a lot of team work.	teamwork
Organizational environment incentives	
1. The operations in our company are non-bureaucratic.	low.bureaucracy
Career incentives	
1. My company gives me the possibility to get ahead.	career.opportunities
2. My effort for the company is recognized.	recognition
Work incentives	
1. I enjoy my work.	fun
2. The manner of doing my job is innovative.	innovative.work
3. I have the possibility to decide how to work.	autonomy
Complexity	
1. Number of departments	departments
2. Number of hierarchy levels	hierarchy.levels
3. Number of employees	employees
4. Number of commercial units	commercial.units
Social environment	
1. In our company we have a good working atmosphere.	working.atmosphere
2. I am able to identify with my company.	company.identification
3. I am in strong contact with the owner, executives and employees.	contact.employees/ executives/owner
PFIP	
1. Incentives are paid on the basis of employee performance and ability.	incentives
2. The salary is mainly based on the position of the employee.	position
3. PFIP represents a large part of the income.	pay.for.performance
4. Incentives are paid mainly for individual performance, not for group performance	individual.performance
5. Employee age has no impact on salary.	age
Intrinsic Motivation	
1. A diversity of work is important for me.	diversity
2. It is important for me to do things that require my skills.	skills
3. I need administrative discretion.	administrative.discretion
4. It is important for me to decide my own methods of work.	industrial.methods
5. It is important for me that my work fulfills me.	fulfillment

Table 4.5. *Measured Items*

Company Size	
0-50	34%
50-100	19%
100-500	47%
Industrial Sectors	
Food industry	3%
Textile industry	5%
Pulp, paper, and paper products	3%
Manufacture of rubber and plastic products	4%
Metal production and processing	8%
Mechanical engineering and vehicle production	10%
Electrical engineering, precision engineering/optics	6%
Chemical industry	4%
Manufacture of other non-metallic mineral products	3%
Wood industry	1%
Service sector and others	54%

Table 4.6. *Company Size and Industry Sectors*

grouped by company size (Panel A) do not differ much from prior research in Germany (e.g. Behrends (2007)). The limited use of stock ownership plans does not surprise according to the company size and the multitude of family-owned enterprises in SMEs. More than half of the companies in the dataset use variable pay to remunerate their employees. Even very small companies use PFP. E.g., 33% of the companies with up to 50 employees use individual incentives. The results show that the use of individual and group incentives is well established in German SMEs. The employees were grouped into executives and skilled workers. Executives are CEOs and middle management, skilled workers represent employees with different trained professions such as information technology, administration, or engineering. Workers on assembly lines are not considered, as they are not in the focus of the research (see Section 4.2.2). Panel B shows that the dataset includes a nearly equal distribution of executives and skilled workers. Executives receive more PFP than skilled workers, although the discrepancy is marginal. Table 4.8 shows demographic characteristics.

Panel A: By Company Size				
Company size	0–50	50–100	100–500	Total
Pay for individual performance	19 (33%)	10 (31%)	37 (47%)	66 (40%)
Pay for group performance	16 (28%)	11 (34%)	31 (40%)	58 (35%)
Stock ownership plan	2 (4%)	3 (9%)	3 (4%)	8 (5%)
No variable pay	30 (53%)	13 (41%)	25 (32%)	68 (41%)
Total	57 (34%)	32 (19%)	78 (47%)	
Panel B: By Employee Position				
Employee position	Executives	Skilled Workers	Total	
Pay for individual performance	35 (40%)	32 (36%)	67 (40%)	
Pay for group performance	33 (43%)	25 (28%)	58 (35%)	
Stock ownership plan	7 (9%)	1 (9%)	8 (1%)	
No variable pay	22 (29%)	42 (41%)	64 (47%)	
Total	77 (46%)	89 (54%)		

Table 4.7. *Usage of PFP Plans*

Position	
Executives	46%
Skilled workers	54%
Qualification	
Ph.D.	3%
University degree	52%
Post-secondary school / industrial training	45%
Seniority	
$<$ 1 year	11%
2–3 years	28%
4–5 years	17%
6–10 years	21%
$>$ 10 years	23%

Table 4.8. *Demographic Characteristics of Survey Participants*

To strengthen the assumption that many SME employees like to avoid control by PFIP in order to maximize their working latitude, the participants were asked if they rejected PFIP in general. 30% of the participants agreed that they did. To identify the risk attitude of the SME employees, the participants were asked, how much of their fixed salary they would agree to reduce for the "likely chance" of a 30% bonus. The results show that the majority of the employees are risk averse. It can be found that for a likely bonus of 30%, the employees would accept an average reduction of 15% of the fixed salary.

Results

To test the hypotheses, the path coefficients in the PLS model must be analyzed. According to Lohmöller (1989), they should be greater than 0.1 for statistical evidence. Due to the lack of distribution assumptions in PLS models (Vinzi et al. (2010), Chin and Newsted (1999)), the statistical significance is tested by the bootstrapping method (Bollen and Stine (1992), Efron and Tibishirani (1993)). The path coefficients and t-statistics for the structural model after the bootstrapping process are shown in Figure 4.8.

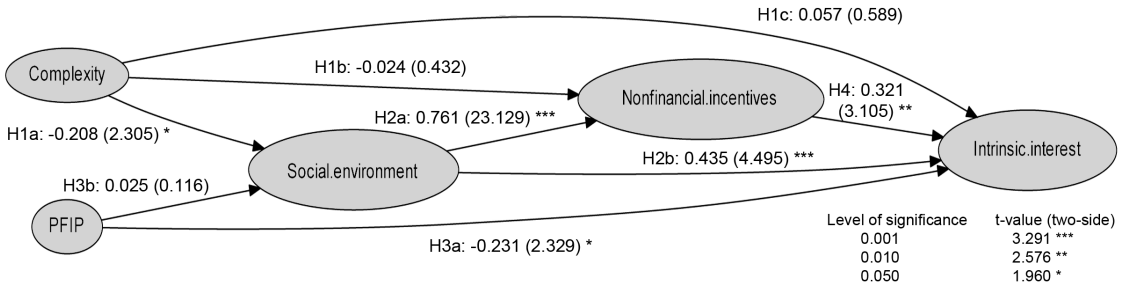

Figure 4.8. *PLS Results: Path Coefficients and t-Statistics*

Hypotheses 1 and 2 describe the effects of the SME characteristics of social environment and complexity. The negative effects hypothesized of complexity on social environment (H1a), nonfinancial incentives (H1b) and intrinsic motivation (H1c) cannot be completely confirmed. A small negative effect of complexity on social environment (H1a) can be found with a path coefficient of -0.208. Obviously, changes

in an organizational structure due to increased complexity diminish a close social interaction between the employees. A potential reason for the neutral effect on intrinsic motivation that is found may be that complexity differences for SMEs up to 500 employees are too small to have a great impact on perceived autonomy and therefore on intrinsic motivation. This effect may occur for bigger companies. Also H1c cannot be confirmed due to marginal complexity differences.

The impact of social environment on nonfinancial incentives (H2a) and intrinsic motivation (H2b) can be considered as substantial. Social environment is one of the key factors in the model. A developed social environment can enhance self-determination and autonomy.

PFIP covers the financial incentives in the model. It was hypothesized that PFIP crowds out intrinsic motivation (H3a) and has a negative impact on the social environment (H3b). The results show there is a small crowding-out of intrinsic motivation by PFIP (-0.231) and no impact on social environment (0.025). Thus, PFIP has a lower negative impact than expected. One reason might be that the interaction of the employees with each other and with executives satisfy the PFIP system requirements and therefore decreases the crowding-out effect. PFIP is not necessarily perceived as control.

H4 can be confirmed. Nonfinancial incentives are positively related to intrinsic motivation because they affect self-determination and autonomy. The results confirm that self-determination and autonomy and the characteristics of SMEs are linked. The SME environment is apt to maintain and enhance intrinsic motivation, which is a main factor of their success. The results of the entire model (structural model and measurement models) are shown in Figure 4.9.

Figure 4.9. *Entire Model*

Model Evaluation

To check the validity of the approach, both the structural model and the measurement models are evaluated. The quality of the structural model can be described by the parameters R^2, f^2 and Q^2. The R^2 statistic is well known from OLS regression and is calculated with the endogenous and exogenous variables as dependent and independent variables. Chin (1998b) recommends $R^2 \geq 0.4$ as a minimum requirement. To analyze the substantial impact of an exogenous variable on a endogenous variable, the effect intensity f^2 is used. According to Cohen (1988), $f^2 > 0.35$ describes a large intensity, $f^2 > 0.15$ a medium intensity, and $f^2 \geq 0.02$ a small intensity. Stone-Geisser's Q^2 is determined by a blindfolding process (Chin (1998b)) and evaluates the forecast relevance of the dependent variables in the structural model (Chin (1998b), Tenenhaus et al. (2005)). The R^2, f^2 and Q^2 values are shown in Figure 4.10.

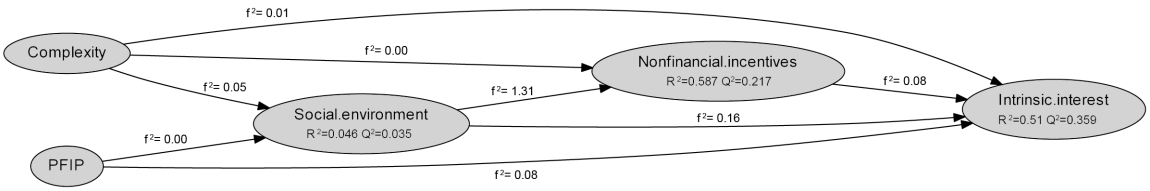

Figure 4.10. *Structural Model Evaluation*

The R^2 values for intrinsic interest and nonfinancial incentives can be considered as substantial. Social environment cannot have a greater R^2 value because complexity and PFIP obviously are not able to explain much of the social environment's total variance. The Q^2 values are fairly larger than 0 for each variable. The strongest effects with respect to f^2 are observed for the impact of social environment on nonfinancial incentives and intrinsic interest, while, consistent with the PLS coefficients, complexity carries the lowest influence. The structural model quality criterions confirm that the structural model is valid, though a slight weakness caused by the explorative nature of the model cannot be avoided.

Regarding the measurement models, there are two methods to determine the latent variables, namely a reflective and a formative one. In the reflective case, a factor analysis is used to determine the latent variable, while in the formative case, the latent variable is determined by OLS. For reflectively measured latent variables, the average variance extracted (AVE) (Fornell and Larcker (1981)) and the composite reliability (Chin (1998b)) are controlled. According to Chin (1998b), the composite reliability should be greater than 0.6, and the AVE greater than 0.5. Furthermore, the factor loadings of the reflective measured variables should be greater than 0.707 to make an explanation contribution to the latent variable (Johnson et al. (2006)). For formatively measured latent variables for multicollinearity was tested. Therefore, the correlations between the measured variables of complexity were analyzed. Only a weak correlation can be found; hence the use of the formative measured variable complexity is allowed. Table 4.9 shows the AVE, composite reliability, and factor loadings. These results are mainly satisfactory and permit the use of the reflective measurement models, even though the AVE criterion is not fulfilled for PFIP and nonfinancial incentives due to the weak explanation contribution of some measured variables. It was decided not to omit these affected variables because the evidence of the entire model is not interrupted, and an omission would be contrary to the theoretical background.

Discussion

The results show that the use of financial and nonfinancial incentives in the SME context can have positive and negative effects on intrinsic motivation. Literature heavily debates if pay for performance pays off (e.g. Eisenberger and Cameron (1996), Kunz and Pfaff (2002)) or if pay for performance diminish intrinsic interest mainly in the context of big companies or laboratory experiments (Deci (1971), Deci (1975), Deci and Ryan (1985), Deci et al. (1999), Frey and Jegen (2001), Bonner and Sprinkle (2002)). Empirical evidence was add on this debate in a context where

Condition:	Factor loadings ≥ 0.707	AVE ≥ 0.5	Composite reliability ≥ 0.6
Nonfinancial incentives		0.3930	0.8326
work.life.balance	0.518		
teamwork	0.454		
low.bureaucracy	0.530		
career.possibilities	0.572		
recognition	0.819		
fun	0.798		
innovative.work	0.559		
autonomy	0.664		
Intrinsic interest		0.7521	0.9381
diversity	0.827		
skills	0.901		
administrative.discretion	0.901		
industrial.methods	0.845		
fulfillment	0.861		
Social environment		0.5521	0.8595
working.atmosphere	0.765		
company.identification	0.793		
contact.employees	0.712		
contact.executives	0.804		
contact.owner	0.627		
PFIP		0.3706	0.7278
incentives	0.819		
position	0.594		
pay.for.performance	0.741		
individual.performance	0.403		
age	0.344		

Table 4.9. *AVE, Composite Reliability, and Factor Loadings*

intrinsic motivation is of high relevance. On the one hand, the results show that there exists a crowding-out of intrinsic motivation by financial incentives (PFIP). On the other hand, the crowding-out effect seems to be less strong than expected and therefore supports the criticism on the psychologic-economic view (e.g. Fang and Gerhart (2012)) and encourage the notion that the principal reason for the success

of financial incentives might be its design (Milkovich et al. (2011)), the existing company structure (complexity), and the kind of employees (assembly line workers versus executives and skilled workers) that are remunerated with PFIP. Even more, there is no negative effect on the social environment as expected.

PFIP and nonfinancial incentives are contrary to each other regarding the influence on intrinsic motivation. The interaction between the social environment within the firm, nonfinancial incentives, and intrinsic motivation is of high relevance in the model. The use of financial incentives like PFIP can diminish intrinsic interest and must be implemented carefully. As a whole, the results support the psychologic-economic literature that argue against PFIP for intrinsically motivated employees.

A limitation of the study is the usage of the partial least squares method. According to missing distribution assumptions for PLS models the statistical significance is only tested by the bootstrapping method. However, choosing the PLS method appears reasonable due to the facts that the sample size is small and that the model is able to link special SME conditions, incentives, and intrinsic motivation, in a rather new way.

4.2.6 Conclusion

The purpose of this study is to discuss the situation of PFP in German SMEs in relation to nonfinancial incentives and to find empirical evidence for the incentive opportunities of SMEs. The descriptive statistics show that PFP is already well-established in Germany. With regard to the incentive, sorting, and crowding-out effect, it was questioned how SMEs are able to reward their employees. To upreflect with the specific SME environment, attention was paid to the main SME characteristics of social environment, complexity, and the lack of resources. Additionally, intrinsic motivation was declared as an important factor of success for SMEs. To

analyze the incentive opportunities of SMEs, an integral approach was created and evaluated using the PLS method.

Intrinsic motivation, nonfinancial incentives, and social environment can be seen as key factors. These key factors are strongly connected and can be used to offer employees a different kind of workplace as compared to big companies. Perceived autonomy and self-determination represent the most important parameters that can be stimulated by social environment and nonfinancial incentives, leading to greater intrinsic motivation. These key factors can be used to compensate for financial incentives—or even more, to create an advantage over to big companies. This requires that employees are intrinsically motivated and value nonfinancial incentives and the different social environment of SMEs. The descriptive statistics reinforce the assumption that SME employees indeed value the SME differences and indicate a sorting effect. The results in the PLS model underline the opportunity of SMEs to compensate for the lack of extrinsic rewards by offering nonfinancial incentives and a developed social environment. Intrinsic motivation is positively influenced by nonfinancial incentives and social environment, so there might be a risk of a crowding-out effect. However, the data shows only a small negative effect on intrinsic motivation and no impact on social environment by PFIP. A stronger negative impact might have been expected due to highly intrinsically motivated employees and the assumed sorting effect. The main reason for the results may be that PFIP may not only be seen primarily as control, but also as motivation. The special SME environment makes it easier to fulfill the incentive system requirements. For this reason, the negative effect might be small in the dataset.

However, the results show that SMEs are capable of retaining highly intrinsically motivated employees, and PFIP does carry some risk of crowding-out this intrinsic motivation. SMEs have to evaluate wether they are capable of complying with the incentive system requirements and if they accept a possible crowding-out effect and

the risk of hidden costs. Installing PFIP is cost-intensive and requires amount of personal, time, and financial resources. So in order for PFIP to pay off, an increase of motivation and outcomes by PFIP (incentive effect) must be high, and a possible reduction of intrinsic motivation (crowding-out effect) must be marginal. Regarding the special SME workplace conditions, the risk of a negative effect of using PFIP seems to be high. Another argument for a cautious use of PFIP in SMEs is that executives and skilled worker are aware of the special SME workplace conditions (selection effect) and knowingly choose SMEs instead of big companies to satisfy their needs of self-determination and autonomy.

Generally, the empirical work supports the economic-psychological literature and their criticism of PFIP, even though the crowding-out effect is quite low in the setting. The main reasons why SMEs are able to maintain highly intrinsically motivated employees are that they offer a developed social interaction within its positive effects and a unique position on the labor market, which can result in a competitive advantage for the organization. These factors may be more powerful than the use of financial incentives.

4.3 Gender and Organizational Performance in Business Succession

The third life-cycle stage in the research framework (see figure 4.1) represents the business succession phase. Business succession could be understood as derivative venture[3] and thus is an essential part of entrepreneurship research. One of the most challenging tasks for business succession is the selection of an appropriate successor and the ominpresent, limited pool of candidates (Bennedsen et al. (2007), Dyer (2006), Pérez-González (2006), Schlepphorst and Moog (2014)). The selection of a female successor, however, plays a minor role in business succession and therefore represents an exception (e.g. Ballarini and Keese (2006), Müller et al. (2011)). Nevertheless, the assumption that women deliberately not want to take over businesses is questionable and therefore gender discrimination seems to be the main reason for this imbalance of male and female successors. Related to this situation is an enormous potential loss for organizations in the succession phase and the following study shows that there do not exist rational arguments to ignore women as successors.

On the contrary, this thesis emphasizes gender as a success factor especially for family businesses in business succession. When looking at the empirical literature a different point of view becomes clear: The gender discourse in entrepreneurship research already started in the 1970s[4] and still continues whereby this discourse highlights a gender gap concerning women as entrepreneurs (e.g. Humphreys and McClung (1981), Kalleberg and Leicht (1991), Marlow et al. (2009), Wilson and Tagg (2010)) and the discussion of male entrepreneurial role models (Ahl (2006), Marlow et al. (2009), Crannie-Francis et al. (2003)) that could lead to a gender bias. Jimenez (2009), Ahrens et al. (2015) e.g. highlight gender discrimination and several drawbacks women have to suffer from but it is mainly ignored to show

[3] For a detailed explanation see section 2.3.

[4] For a detailed discussion of the gender discourse in entrepreneurship look at Ahl (2004).

empirically that females could be a significant success factor especially in family businesses (exceptions are e.g. the studies by Pyromalis et al. (2006) and Allen and Langowitz (2003)).

Regarding the specific case of business succession Galiano and Vinturella (1995) talk about a gender-blind succession planning and wrote on page 184: "Other reasons for failed succession relate to the lack of a suitable successor or a bad choice of successor. Bad choices can sometimes result from the systematic exclusion of women candidates." The following study contributes to this research stream by analyzing of womens' abilities to manage business succession and shows that women candidates influence organizational performance as well as male successors. Furthermore, it is pointed out that female successors could be a solution for the limited pool of candidates and therefore represent an important success factor for family firms in the succession phase.

4.3.1 Introduction

Females are still underrepresented in management positions and business succession. Regarding the female underperformance hypothesis[5] it is not surprising that women in management positions and business succession constitute an exception. The amount of women as successors is estimated between only 13-25% depending of the observed industry sector (e.g. Ballarini and Keese (2006), Müller et al. (2011)) that could be evaluated as very low. Entrepreneurship research observes a gender gap for women in managing positions in general and for business succession in particular.[6] Scholars that deal with gender inequality have explored the gender gap in

[5] The female underperformance hypothesis describes the assumption that female business owners perform less than their male counterparts (e.g. Fischer (1992), Rosa et al. (1996)).

[6] The business succession can be understood as derivative venture and therefore belongs to the research field of entrepreneurship (Szyperski and Nathusius (1977)). Thus, derivative ventures represent a kind of new venture formation with existing organizational structures and resources.

entrepreneurship extensively in the past years and predominantly come to the result that females are as good as men in managing firms (Kalleberg and Leicht (1991), Du Rietz and Henrekson (2000), Zolin and Stuetzer (2013)) or have different perceptions of organizational performance[7] that could lead to a faulty evaluation of womens' management ability (Crannie-Francis et al. (2003)). However, women are still underrepresented in management positions and in business succession (Müller et al. (2011), Ahrens et al. (2015)).

This study adds empirical evidence to the gender discourse in entrepreneurship literature by testing the female underperformance hypothesis in the special context of business succession with rich European data and additionally provides highly policy relevant results. Regarding the demographic change especially for Germany one of its consequences concerns a limited pool of candidates for business succession (e.g. Kay and Suprinovic (2013)). One solution could be the change of the awareness of male predecessors that male successors are favored (Blotnick (1984), Rosenblatt et al. (1985), Dumas (1990)) for business succession. According to this, a lack of potential business succession candidates could be mitigated by female successors. To reach this goal it is essential to investigate if male and female successors are equally successful regarding organizational performance for business succession, and if the assumption of equal capabilities of men and women in business succession is robust to increase public awareness that women are as successful as men.

Regarding the gender discourse offers that many empirical research results are biased towards structural barriers women have to suffer from (liberal feminist theory), gendered characterizations and stereotypes that lead to a faulty evaluation of womens' organizational performance (social feminist theory) and the self-selection effect that suggest that relatively privileged women in comparison to the 'average' women can be found in organizations. It is not objective and insufficient to compare female-

[7] Further information for the perceptions of organizational performance are given in chapter 2.4.

and male-headed firms without taking into account that women have a lower access to financial resources than men (e.g. Marlow and Patton (2005), Hisrich and Brush (1987)). Women in general are located more in service and trade industries (e.g. Marlow et al. (2009), Wilson and Tagg (2010)) that traditionally have a lower profitability and smaller growth rates, and women have less business experience (Humphreys and McClung (1981), Verheul and Thurik (2001)). Another problem concerns the fact that our masculine society that evaluates performance with male standards (e.g. Crannie-Francis et al. (2003)) and therefore womens' performance may not be evaluated adequately. These male standards are e.g. the comprehension of performance in terms of growing and financial success whereby women very often evaluate performance with subjective performance measures (Cadieux et al. (2002), Kesner and Sebora (1994)).

The purpose of this study is to avoid these biases as good as possible to maximize the probability of a fair comparison of the organizational performance of men and women. "Fairness" can be reached by using business succession data of family firms. In the case of a business succession an emergency situation like a sudden failure of the predecessor very often leads to a female successor instead of a male one (e.g. Dumas (1988), Vera and Dean (2005)). In this kind of situation structural barriers for women and the self-selection effect should be minimal here. Different preconditions and discrimination women are usually faced with do not exist because they take over an ongoing organization that has a financial base, staff, network ties, share- and stakeholder etc. If the assumption is robust that women often take over businesses in emergency situations or because there is no male successor available in the family, it is advisable to observe gender differences or equalities better with data from business succession in family firms. Therefore the results in this chapter are not only relevant for the special context of business succession but also for women as business owners in family firms in general.

To test the female underperformance hypothesis log-linear and linear regression models with objective and subjective success indicators are used. The objective performance indicators are *sales*, *quantity of employees* and *sales per employee*. The subjective performance indicators are a *satisfaction scale*, and *growth prospects*. It can be stated that for all of these success indicators women are equal to men.

The study is organized as follows: The next section briefly discusses the theoretical background regarding gender, organizational performance and feminist theories. The section that follows explains the data and statistical methods used. Then the empirical results are shown and the final section discusses the results and makes some concluding remarks.

4.3.2 Theoretical Background

As Marlow and Patton (2005) demand, future critical debates about female entrepreneurship need a conceptual foundation to contribute to explanatory theory. This refers in particular to the problem that many scholars dealing with gender and entrepreneurship do not regard liberal and social feminist theories (Black (1989), Jaggar (1983), Sexton and Bowman-Upton (1990)) as it should be. These two theories represent contrasting explanatory approaches for gender differences and therefore should be analyzed carefully. The following paragraphs discuss the different feminist theories in contrast to each other and the self-selection effect that is often ignored in gender studies.

Social Feminist and Liberal Feminist Theories

Social feminist theory considers gender as a social construct. The theory suggests that men and women have basically different ways of thinking, acting, and viewing the world due to socialization but, none of the ways is superior. Furthermore, the physiological differences determine a person's sex but not a person's gender that

depends to a high extend on experiences during ones lifetime.[8] Fischer et al. (1993) argue on pages 154 and 155: "It must be noted, though, that caregivers and others who interact with a person throughout their lifespan will vary somewhat in their reactions to a male versus a female, and thus a person's gender is not completely determined by their sex. That is, there will be considerable within-sex, as well as between-sex, variation in experiences." The social feminist theory points out that women are fundamentally different to men but not inferior: They do it the same way but differently. Even more, gender as a social construct emphasizes that the male way of thinking and acting is seen as the positive one and reflects the standard in our society (Crannie-Francis et al. (2003), Shakeshaft and Newell (1984), Bradley (2007)) and that these male norms could lead to incorrect evaluation of female behavior and output (Bird and Brush (2002)). Ahl (2007) argues that the usual entrepreneur is characterized with the same attributes as used to describe manhood. Empirical results show that women tend to take fewer risks (e.g. Kepler and Shane (2007), Watson and Robinson (2003)) and that they are concentrated more on a better balance between work and family (e.g. Kepler and Shane (2007), Jennings and McDougald (2007)) than men. Other results show only marginal differences between men and women in psychological characteristics like compassion, self-actualization, tendency to conform, energy level, risk-taking propensity, social adroitness, value placed on autonomy, self-confidence etc. (Kalleberg and Leicht (1991), Fagenson (1990), Sexton and Bowman-Upton (1990), Birley (1988). Thus, the assumption that men and women are totally diverse and therefore perform differently in the context of business and managing ability appears at least questionable.

Instead of social feminist theory liberal feminist argues differently. This theory focuses the rational capacity of human beings and suggest that women and men have the same potential for rationality (Fischer et al. (1993), Ahl (2006)). Another key

[8] A detailed discussion of the originally differentiation between sex and gender can be looked up by McHugh et al. (1986) and Unger (1979).

point of this theory describes that (traditional) discrimination and unequal opportunities for women lead to differences regarding organizational performance between men and women (Fischer et al. (1993), Ahl (2006)). If discrimination and unequal opportunities disappear, gender differences would become obsolete. Prior research results show that differences can be observed between men and women in organizational performance in entrepreneurship literature. According to liberal feminist theory these differences are caused by structural barriers female entrepreneurs have to deal with. E.g. businesses owned by women are often located in service and trade industries that generally have lower growth rates and less success (Humphreys and McClung (1981), Kalleberg and Leicht (1991), Marlow et al. (2009), Wilson and Tagg (2010)). Additionally, the technology sector where men dominate generates higher returns than the service industry (e.g. Allen et al. (2007)). Another reason for gender differences is that a lot of companies owned by women have less employees (Charboneau (1981), Humphreys and McClung (1981), Carter and Marlow (2007)) and therefore are less successful. More structural barriers are less business experience of female entrepreneurs (Humphreys and McClung (1981), Verheul and Thurik (2001)) and lower innovativeness (Hisrich and Brush (1987)). Further, women work fewer hours per week than men and prefer flexible working patterns like home-based firms due to child care (Hundley (2001), Rouse and Kitching (2006), Bradley (2007), Jayawarna et al. (2013)). Another important structural barrier is that women have problems to get access to financial resources (Aldrich et al. (1997), Brush (1997), Carter and Rosa (1998), Marlow (2002), Marlow and Patton (2005), Kelan (2009), Wynarczyk and Marlow (2010), Carter et al. (2007)) and this undercapitalization has been identified as a major problem for female entrepreneurs to build up high-growth enterprises (Carter and Rosa (1998), Carter (2000)).

The Self-Selection Effect

Another problem that can lead to biased results in gender studies is described by

the self-selection effect. In the majority of gender studies the self-selection effect represents a serious limitation. The self-selection effect implies that the results of empirical studies that discuss gender equality could be biased towards women that are relatively privileged in comparison to the "average" woman, and men. Thus, the self-selection effect describes that women that start businesses or in the case of business succession are above average in education and performance. This possible self-selection effect could be a serious limitation in the interpretation of research results dealing with the interaction of gender and organizational performance in terms of a positive or negative bias (e.g. Fischer et al. (1993)). Reasons for a self-selection effect could be the glass ceiling effect, different preconditions for women or discrimination so that only the best women can be found in management positions. Whether the women that are observed in the empirical studies are in general above average in comparison to other women and men or not is a still unanswered question. To check this it is not satisfactory to observe only descriptive statistics of the womens' education in the data. Moreover, it is very difficult to identify women that are above average in a bunch of characteristics. Thus, it would be useful to find a situation where the probability of a self-selection effect is minimal. Such a situation can be found in the context of family business and business succession. Beside the discussion how a successor is recruited and selected (Schlepphorst and Moog (2014)), family members in general are chosen for succession in family firms due to family ties (Miller et al. (2003)), nepotism (Kets de Vries (1994), Pérez-González (2006)) or the limited pool of candidates (Bennedsen et al. (2007), Dyer (2006), Pérez-González (2006)). However, the selected successor very often is a son or a daughter of the predecessor whether or not this form of succession is the best for the firm. What does this form of succession have to do with the self-selection effect? In general, sons are desired for business succession (e.g. Blotnick (1984), Rosenblatt et al. (1985), Dumas (1990)) and very often an emergency situation like a sudden failure of the predecessor or the lack of a son leads to a female successor instead

of a male one (e.g. Dumas (1988), Vera and Dean (2005)). In this situation the self-selection effect should be minimal. Even more, different preconditions women are usually faced with do not exist because they take over an ongoing organization that has a financial base, staff, network ties, share- and stakeholder etc. If the assumption is robust that women often take over businesses in emergency situations or because there is no male successor available in the family it is possible to observe gender differences better with data from business succession.

4.3.3 Hypothesis Development

As a whole, there is no theoretically foundation for performance differences between men and women. Social feminist theory points out that women act differently than men but not inferior and liberal feminist theory argues that without discrimination and structural barriers for women gender differences should disappear. Regarding the special situation of business succession in family firms the probability for different preconditions for women is minimal as women take over ongoing organizations. Additionally, business takeovers in emergency situations minimize the probability for a self-selection effect.

These aspects lead to the hypothesis that **women do not underperform compared to men concerning objective and subjective performance indicators in business succession**. To get unbiased results a methodologically correct research is crucial. The methodological approach used here is very similar to the studies of Kalleberg and Leicht (1991), Du Rietz and Henrekson (2000), and Robb and Watson (2011). The study controls for age, education, work experience, working hours, business characteristics etc. and then a clearer view on gender differences is possible. In detail it is tested if women are equal to men in terms of *sales*, *number of employees*, *sales per employee*, *satisfaction (SOEP scale)* and *growth prospects*.

The method used, the performance measures and the control variables are carefully described in the next section.

4.3.4 Method and Sample

The study uses data from German-speaking Europe with 4,384 firms collected by the University of St. Gallen, University of Economics Fribourg, University of Liechtenstein, University of Siegen and the Johannes-Kepler-University Linz. The respondents from Austria must be omitted because in the Austrian data there are no female successors so 2,932 firms left. From these 2,932 firms are 1,333 business takeovers and 1,076 family firms. The usable data drop from 1,076 to 608 for this study because only business takeovers after 5 and up to 25 years of succession are used. Reasonable for this 20 years interval of succession is that business takeovers in the first 5 years are shaped by amount of problems while the survival of the firm is focused by the successors (e.g. van Praag (2003)). Furthermore, the cooperation of successor and predecessor is very high in this 5 years time frame so the attribution of success to one of them appears difficult. After 25 years of succession most of the successors turn into predecessors so the limit is set up to 25 years of succession.

The data include only business takeovers in family firms. There exist two main reasons why business succession data seem to be appropriate for a gender study concerning organizational performance in entrepreneurship. First, as discussed in the previous section 4.3.2, it can be assumed that in business succession structural barriers that can lead to gender discrimination (e.g. Du Rietz and Henrekson (2000)) are eliminated. The successor takes over an entire organization with all its share- and stakeholders, financial resources, innovations, employees, problems, opportunities etc. Undercapitalization of female entrepreneurs (Marlow (2002), Marlow and Patton (2005), Kelan (2009), Wynarczyk and Marlow (2010)) e.g. should not play a role in the case of succession. Even more, size and industry sector of the

organizations are randomly distributed over the successors in the data. Gender discrimination like the glass ceiling effect should be minimal for family firms and as well for business succession (Cole (1997)). Jaffee (1990) e.g. reports that the glass ceiling effect is lower in family businesses. Generally, family businesses are seen as a great opportunity for women to stay in business (Bork (1986), Jaffee (1990), Nelton (1986), Salganicoff (1990)). Salganicoff (1990) shows that there are better positions, higher incomes, and more flexibility in work schedules for women in family businesses.

The second reason why business succession in family firms is used is the assumption that the self-selection effect is minimal in this setting. To check this the successors were asked in detail who they are. In the data 14.5% of the 608 successors are women. 87% of these women are family members and 12.2% non family members. This distribution is a first indicator for the assumption of a minimal probability for the self-selection effect and lower gender discrimination in the data regarding the small quote of external successions. It can be expected that the majority of these women became successors due to an emergency situation like a sudden failure of the predecessor (see also section 4.3.1).[9] To ensure the assumption that there is a minimal self-selection-effect human capital variables between men and women are compared with the χ^2-test for independence. The tested variables are the education level, work experience in years, and the main education content (focus on natural sciences, economics, humanities sciences, arts, and social sciences). Table 4.10 shows the results of the χ^2-test.

[9] This assumption still has to be confirmed by a second wave of the survey that is currently in process.

Education level	χ^2	p-value
No educational qualification	0.855	0.355
Elementary school	3.637	0.057
Secondary school	1.5	0.221
High-school graduation	0.687	0.407
Semiskilled workers	7.984	0.005**
Apprenticeship	4.147	0.042*
Mastership examination	6.032	0.014*
University degree	2.824	0.093
Doctorate, PhD., Prof.	0.196	0.658
Work experience	6.337	0.275
Main education content	30.830	0.000***

*** p-value ≤ 0.001, ** p-value ≤ 0.01, * p-value ≤ 0.05

Table 4.10. *χ^2-Independency-Test Results for Human Capital*

The results indicate that there is almost no evidence for higher educated or privileged women compared to men or vice versa. The χ^2-independency-test for the education level only points out that men have higher rates for apprenticeship and mastership examination whereby more women operate as semiskilled workers[10]. The remaining education levels do not reveal gender differences as well as the working experience. A highly significant gender dependency exist for the main education content. Women are more educated in economics in contrast to men who favor natural sciences. As a whole, the χ^2-independency-test results show only marginal gender differences that do not indicate that women are higher educated than men, consequently the existence of a high self-selection effect in the data can be negated.

[10] Semiskilled workers describe workers that are trained by the organization without qualification.

To test the hypothesis multiple regression analysis is used. The dependent variables are common objective success indicators as used in management and entrepreneurship literature like number of employees, sales, sales per employee (e.g. Murphy et al. (1996), Carton and Hofer (2006)) and subjective success indicators (Cholotta (2012), Moog and Soost (2013)). Additionally, the successors were asked about economic growth prospects for the next three years concerning sales, market share, ROI, equity ratio and innovation (development of new products/services). Out of these growth characteristics an index is built. The subjective success indicators are represented by a satisfaction scale to measure organizational performance taken from the German Social-Economic Panel study (SOEP) executed by the German Institute for Economic Research (DIW). Subjective success indicators are used because success cannot be measured exclusively with monetary operating figures. The achievement of personal targets is highlighted (Cabrera-Suárez et al. (2011)), can lead to satisfaction and this in turn can be defined as success (Rauch and Frese (2000)).[11]

The independent and control variables used in this study are shown in the following table 4.11. In line with Kalleberg and Leicht (1991), Du Rietz and Henrekson (2000) and according to section 4.3.2 several control variables are included in the regression models to avoid structural biases. These are human capital variables like education, working experience, working hours per week, industry sector variables, and control variables for the use of financial resources to check for a suggested undercapitalization. The gender effect is measured by a dummy variable. It must be noted that multicollinearity was checked by the VIF. The VIF for all variables included in the regression models did not indicate any multicollinearity problems.

[11] For further information look at section 2.4.

Variable label	Description
Gender	male=0 and female=1
Working hours	Average weekly working hours
Work experience	Number of years in business
Size	Number of employees (0-9, 10-49, 50-249, 250+)
Human capital controls	Formal education (no degree, secondary/intermediate school, university admission, apprenticeship, holding master, university degree, PhD, Others) (dummies)
Industry sector controls	Manufacturing; Wholesale and retail trade, accommodation and food service activities; Transports, financial intermediation, education, human health; Real estate activities, administrative and support service activities; Others (dummies)
Controls for the use of financial resources	Equity capital, bank loan, supplier credit, inhouse financing, factoring, leasing, equity financing, company share (likert-scales ranging from 1=very low use to 5=strong use)

Table 4.11. *Independent and Control Variables*

4.3.5 Empirical Results

Descriptive Statistics

The following tables show the frequency distribution of company size, industry sectors, and the education as well as the used independent variables and descriptive statistics.

Company Size	
0-9	31.7%
10-49	28.8%
50-249	33.9%
250+	4.9%
Industry Sectors	
Manufacturing	34,5%
Wholesale and retail trade, accommodation and food service activities	19.9%
Transports, financial intermediation, education, human health	15.8%
Real estate activities, administrative and support service activities	27.1%
Others	0.7%
Missing Values	2%
Education	
No education	1%
Secondary school	24.3%
Elementary school	31.3%
High school graduation	39.6%
Semiskilled workers	8.4%
Apprenticeship	54.8%
Mastership examination	18.9%
Doctorate, PhD., Prof.	4.3%
University degree	41.4%
Else	8.2%

Multiple answers possible for the education level.

Table 4.12. *Company Size, Industry Sectors, and Education*

Items	Mean	Standard deviation
Employees	94.23	532.71
Sales (thousand)	29633	323191
Sales per employee (thousand)	497	5104
Satisfaction scale (SOEP)	7.34	1.68
Economic growth prospects	3.54	0.77
Working hours	54.54	13.33
Industrial experience	27.33	9.27
Gender	0.15	0.352
Equity capital	3.89	1.243
Bank loan	2.61	1.361
Supplier credit	1.71	1.086
Inhouse financing	3.71	1.384
Factoring	1.15	0.610
Leasing	2.03	1.169
Equity financing	1.06	0.329
Company share	1.01	0.201
Other financing	1.09	0.471

Table 4.13. *Descriptive Statistics*

Before the multivariate results are presented, mean differences of the use of financial resources and the dependent variables between male and female successors are

analyzed. The following table 4.14 shows the Kruskal-Wallis-H-test[12] results concerning the use of financial resources. Almost no gender differences for the use of financial resources exist apart from the use of inhouse financing that is utilized more by male successors. These results reveal no discrimination of women to gain financial resources as it can often be observed for females in new ventures (Aldrich et al. (1997), Brush (1997), Carter and Rosa (1998), Marlow (2002), Marlow and Patton (2005), Kelan (2009), Wynarczyk and Marlow (2010), Carter et al. (2007)). Thus, as expected, this structural barrier women have usually to suffer from did not appear for business succession.

	Mean male	Mean female	p-value
Equity capital	3.71	3.69	0.789
Bank loan	2.76	2.84	0.544
Supplier credit	1.8	1.73	0.699
Inhouse financing	3.63	3.31	0.025*
Factoring	1.16	1.14	0.963
Leasing	2.04	2.21	0.173
Equity financing	1.1	1.15	0.275
Company share	1.03	1.00	0.267

*** p-value ≤ 0.001, ** p-value ≤ 0.01, * p-value ≤ 0.05

Table 4.14. *Mean Comparison Tests for the Use of Financial Resources*

Table 4.15 shows the mean comparison test results tested with the Kruskal-Wallis-H-test for the objective and subjective success factors between men and women in dependence of the industrial sectors and the SME size categories.

[12] The Kruskal-Wallis-H-test is a nonparametric alternative for the independent two-sample t-test.

	Employees		Sales		Sales/Employee		Satisfaction		Growth prospects	
Industrial sectors	Mean	Sign.	Mean	Sign.	Mean	Sign.	Mean	Sign.	Mean	Sign.
Manufacturing	♀	0.712	♀	0.884	♂	0.139	♀	0.389	♂	0.608
Wholesale and retail trade, accommodation and food service activities	♂	0.004**	♂	0.006**	♂	0.152	♀	0.771	♀	0.016*
Transports, financial intermediation, education, human health	♂	0.054	♂	0.265	♀	0.420	♀	0.162	♂	0.254
Real estate activities, administrative and support service activities	♂	0.068	♂	0.021*	♂	0.321	♂	0.269	♂	0.207
SME size categories										
Very small (0-9 employees)	♂	0.297	♂	0.057	♂	0.030*	♂	0.950	♀	0.172
Small (10-49 employees)	♂	0.907	♀	0.610	♀	0.458	♀	0.346	♂	0.560
Medium (50-249 employees)	♀	0.338	♀	0.787	♂	0.638	♀	0.143	♂	0.530
Big (250+ employees)	♀	0.668	♂	0.308	♂	0.131	♀	0.713	♂	0.632

♂ = higher mean for male successor, ♀ = higher mean for female successors, *** p-value ≤ 0.001, ** p-value ≤ 0.01, * p-value ≤ 0.05

Table 4.15. *Objective and Subjective Success Factors in Dependence of Industrial Sectors and SME Size Cateogries*

Some gender differences can be observed in different industrial sectors. Regarding the manufacturing branch there are no gender differences for the observed objective and subjective success factors. For the wholesale and retail trade, accommodation and food service activities sector men have statistically significantly more employees and higher sales whereas women show more positive growth prospects. No gender differences appear in the transports, financial intermediation, education, and human health sectors. Finally, in real estate activities, administrative and support service activities men generate higher sales than women. Regarding the objective success factors and especially the relative key ratio sales per employee no gender differences across the different industrial sectors could be found. Analyzing the different SME size categories demonstrate that men do not outperform women. There are no statistically significant mean differences for the observed success factors except for sales per employee in very small firms. In this SME size category men have a higher mean in sales per employee than women.

These first results reveal only marginal gender differences in business succession. The following paragraph presents the multivariate analysis with OLS regressions.

Multivariate Results

The following tables present the regression results. In order to obtain clarity only the significant control variables are presented in the tables. Table 4.16 shows no gender effect in the relative key ratio sales per employee and the satisfaction scale (SOEP). The further results for the dependent variable sales per employee indicate that the industry sectors transports, financial intermediation, education, and human health reveal a lower return per employee in comparison to the manufacturing sector (reference category). A positive effect arises from the use of equity financing. Regarding the education level it can be shown that successors holding a master degree perform less.

	ln(sales/employee)		**Satisfaction**	
Variable	Estimate	p-value	Estimate	p-value
Intercept	11.551	0.000***	1.925	0.000***
Gender	-0.271	0.108	0.025	0.572
Working hours	0.003	0.509	-0.001	0.489
Work experience	-0.008	0.202	0.000	0.857
Size				
0-9 employees	0.220	0.400	-0.016	0.829
10-49 employees	0.176	0.490	0.056	0.419
50-249 employees	0.032	0.898	0.047	0.494
Sign. control Variables				
Transports, financial intermediation, education, human health	-0.357	0.023*		
Equity financing	0.406	0.026*		
Holding master	-0.445	0.003**		
Education: Others			0.108	0.035*
Supplier credit			-0.051	0.000***
Inhouse financing			0.032	0.007**
n	399		445	
R^2	0.118		0.129	
Adj. R^2	0.054		0.072	
F-value	1.846		2.285	

*** p-value ≤ 0.001, ** p-value ≤ 0.01, * p-value ≤ 0.05

Table 4.16. *Regression Results: Ln(sales/employee), satisfaction scale*

The regression results for the satisfaction scale are partially surprising. The working hours have no effect on the satisfaction and additionally there is no gender effect. It could have been expected that women are more satisfied than men regarding that previous empirical results emphasize that women are more concentrated on satisfaction as success factor (e.g. Cholotta (2012)). Furthermore, an education level far away from the usual has a positive impact on satisfaction as well as the use of inhouse financing. At least, the use of supplier credits diminishes satisfaction.

Variable	ln(sales) Estimate	p-value	ln(employees) Estimate	p-value
Intercept	16.879	0.000***	5.833	0.000***
Gender	-0.220	0.242	0.060	0.461
Working hours	0.017	0.001***	0.008	0.000***
Work experience	-0.014	0.040*	-0.004	0.224
Size				
0-9 employees	-4.432	0.000***	-4.878	0.000***
10-49 employees	-2.825	0.000***	-3.253	0.000***
50-249 employees	-1.497	0.000***	-1.776	0.000***
Sign. control Variables				
Wholesale and retail trade, accommodation and food service activities			-0.214	0.004**
Real estate activities, administrative and support service activities			-0.136	0.042*
Transports, financial intermediation, education, human health	-0.575	0.001**		
Holding master	-0.424	0.014*		
Inhouse financing	0.413	0.045*		
n	406		445	
R^2	0.633		0.883	
Adj. R^2	0.607		0.875	
F-value	24.182		116.440	

*** p-value ≤ 0.001, ** p-value ≤ 0.01, * p-value ≤ 0.05

Table 4.17. *Regression Results: Ln(sales), ln(employees)*

Table 4.17 shows the regression results for the absolute key figures sales and employees. Not surprisingly, small firms have lower sales and fewer employees in comparison to big companies (reference category). An interesting insight is shown by the effect of working hours on sales and employees. Successors that work more hours have more sales and employees. Additionally, work experience has a negative impact on sales. This negative relationship is contradictory to theory that suggests a positive impact of human capital variables on organizational performance (Unger et al. (2011)). For business succession this relationship has to be reconsidered and must be further in-

vestigated. Furthermore, statistically significant control variables for the regression with the dependent variable sales are the transports, financial intermediation, education, and human health sector that have lower sales than the manufacturing sector (reference category), and the education level of holding a master. A positive effect on sales can be observed by the use of inhouse financing. Finally, wholesale and retail trade, accommodation and food service activities, real estate activities, and administrative and support service activities have a negative impact on the quantity of employees.

Variable	Estimate	p-value
Intercept	2.820	0.000***
Gender	-0.003	0.978
Working hours	0.007	0.020*
Work experience	0.000	0.991
Size		
0-9	-0.030	0.864
10-49	0.083	0.622
50-249	0.123	0.453
Sign. control Variables		
Transports, financial intermediation, education, human health	-0.265	0.016*
No degree	0.948	0.022*
Secondary/intermediate school	-0.218	0.027*
University admission	0.182	0.046*
Inhouse financing	0.116	0.000***
Factoring	0.180	0.005**
n	379	
R^2	0.189	
Adj. R^2	0.127	
F-value	3.037	

*** p-value ≤ 0.001, ** p-value ≤ 0.01, * p-value ≤ 0.05

Table 4.18. *Regression Results: Economic growth prospects*

The regression results for the economic growth prospects in table 4.18 reveal that the increase of working hours leads to better economic growth prospects as well

as the use of inhouse financing and factoring. The findings for the education level reveals that successors with no degree and university admission have higher economic growth prospects. These successors seem to be more optimistic than graduates. The economic growth prospects are lower for successors with an intermediate school level, and with a firm that belongs to the transports, financial intermediation, education, and human health sector.

As a whole, the regression results show that there are no gender differences in business succession for objective and subjective performance measures with the attention of important control variables that have to be taken into account (see section 4.3.2) to ensure unbiased results. Thus, there are no indications that women perform less than men in business succession.

4.3.6 Discussion and Limitations

This study tests the female underperforming hypothesis in a new and rarely observed field: Family business and succession. In their paper of 2011 Marlow and McAdam explored the mystery of the underperforming female entrepreneur (Marlow and McAdam (2013)) in line with liberal feminist theory. They highlight that lower organizational performance of female-headed organizations in comparison to male-headed firms should not be confused with underperformance. Smallness and concentration in service and trade industries of female-headed firms, discrimination and structural barriers women have to deal with cause lower performance. A comparison between men and women under these circumstances appears not to be fair. This could be avoided easily by using the correct methodological approach when testing the female underperforming hypothesis. Indeed, this is a statistical issue. A further problem in gender studies is described by the self-selection effect. This effect describes women that are relatively better than the 'average' women or men and

could lead to biased results in gender studies. Business succession data minimizes this problem and the descriptive results do not indicate a self-selection problem.

The regression results show that there are no gender differences in the case of business succession. Thus, this study is in line with prior results (e.g. Kalleberg and Leicht (1991), Du Rietz and Henrekson (2000), Watson and Robinson (2003) and increases the validity of empirical research results concerning gender and organizational performance. Therefore, this study could be recognized as replication study (for a detailed analysis of the use of replication studies look at Hubbard et al. (1998), Davidsson (2005)) that strengthens the insight that the female underperformance hypothesis is not durable at all. Furthermore, the results show that predecessors do not have to be afraid of female successors. Regarding that women are very often only the "second choice" in the succession selection process (Dumas (1988), Dumas (1990), Rosenblatt et al. (1985)) the results are of high practical relevance. Emphasizing women as potential and equally capable successors as men could help to expand the limited pool of candidates for business succession (Müller et al. (2011), Kay and Suprinovic (2013)). Comparing the phenomenon that females are underrepresented in managing positions and the empirical results given in this study reveals an enormous potential for business owners and especially predecessors in family firms. Disregarding women as equally capable and excellent performing successors is irrational and could be hazardous for the organization. Thus, gender can be understood as success factor for family firms in business succession.

A limitation refers to the family firm environment. As in the data the majority of the family firms are small and medium-sized enterprises. This firm sector is characterized by a high uncertainty (Henrekson and Johansson (2010)) and the influence of entrepreneurial resources or personal characteristics (e.g. human capital, education etc.) on organizational performance is often marginal (Stringfellow and Shaw (2009)). This implies the assumption that environmental influences have a

deeper impact on organizational performance than entrepreneurial resources and therefore gender as influence factor appears to be of secondary importance. It can be stated that this criticism is not durable enough to make the research on gender and organizational performance unnecessary, especially not by taking into account the high practical and policy relevance of this research. Another limitation refers to the business take-over motivations of the successors. It is not possible to control for these motivations which could influence the objective and subjective success indicators. A further study that links gender, organizational performance, and take-over motivations would be helpful. Additionally, the assumption that the female successions were mainly emergency takeovers needs further evidence. However, to clarify if women are able to manage firms and to succeed as well as men is of high relevance and important for entrepreneurship literature, the predecessors, and policy makers.

Chapter 5

Discussion

Success is a science; if you have the conditions, you get the result.

Oscar Wilde

(1854-1900)

Regarding this quote, Oscar Wilde understands success as something complex and he believes that conditions are crucial to have success. We do not know exactly what he meant by conditions but we know that it is possible to influence the conditions to our advantage. This work spents a great deal of effort to explore how team diversity, incentives, and gender have a functional relationship to different success measures and shows that success can be influenced by these success factors. Even if Oscar Wilde would probably have been a friend of the research on success factors the value of such research is often criticized. March and Sutton (1997) go so far as to impute that researchers in the field of organizational performance are still searching for success factors even if they know that it is useless. Although this statement seems very hard there exists critique for the research on success factors that has to be discussed. Principally, this critique concerns the discussion

of rigor vs. relevance[1] or in other words the absence of practical relevance of a huge amount of success factor research results. Furthermore, the results are often ambiguous and suffer from methodical weakness. All this criticism can lead to the assumption that research on success factors and organizational performance do not have legitimacy. Thus, it is just consequent to scrutinize this work critically. The following paragraphs briefly discuss the existing critique of the success factor research and the consideration of this critique in this work.

Ambiguous research results create the impression that researchers in this field could save their efforts for more useful things and that this research discipline has a lack of generalizability. One example could be the demographic characteristics that influence organizational performance discussed in chapter 1. The results concerning this relationship are mixed. But, do mixed results indicate useless research? Here a fundamental error takes place in the way of thinking. Ambiguous results are not the evidence for a negligible research but rather a reference for an enormous complexity and the need for more sophisticated research methods to improve the findings. Even more, every empirical research reduces the reality to a model that obviously could not be without limitations. Another reason for mixed results could be different context factors that could not be measured adequately under all circumstances and therefore influence the study outcomes so that diverse findings occur.

It becomes clear that the demand for generalizability of results and mixed findings are connected with the (statistical) methods used. It is important to use the most appropriate method for the underlying research question. Therefore, the accuracy of the method must be the criterion and not the most complex statistical approach. In this work PLS and OLS regression is used to verify the hypotheses. While OLS regression is known as a standard tool the use of PLS is rather unknown and more complex. This statistical method is able to test mediation effects directly in the

[1] See e.g. the special issue to this debate in the Academy of Management Journal, Vol. 44, No. 2, 2001

model, captures complex relationships in an entire model, and is suitable for small sample sizes. There are two sides of every coin so that the PLS method also has some shortcomings like the missing distribution assumptions in such models that facilitate the use of the data but complicates the application of significance tests so that the bootstrapping method has to be used to test significance. However, this work tries to use the most appropriate statistical methods to add empirical evidence and to deliver practical implications.

Regarding the rigor vs. relevance debate Nicolai and Kieser (2002) e.g. argue that scientists and practitioners do not work together and even are not interested in cooperating. Furthermore, they write that scientists pursue primarily the aim to publish their results as well as possible whereas practitioners only use scientific results after a strong modification most suitable for them. Even if this point of view seems to be excessive the rigor vs. relevance debate discusses a possible trade-off between scientific rigor and practical relevance. However, without a detailed evaluation of this debate at this stage it becomes clear that the research on success factors that influences organizational performance should add new theoretical insights and additionally should be suitable for practitioners as well to gain legitimation. This work is based on the assumption that rigor and relevance are not in contradiction to each other. Quite contrary, a high level of scientific rigor could also lead to highly practical relevant results. The importance of the practical relevance is a key requirement of this work that could be achieved. Concerning the scientific rigor this work exclusively uses quantitative empirical methods to explain the relationship between success factors and organizational performance that are seen as most appropriate to fulfill the requirements of scientific rigor.[2]

At this point, attention should be paid to the fact that research on success factors will never be without criticism. Every functional relationship of success factors and

[2] For detailed examination what is understood as scientific rigor and its requirements look at Academy of Management (2002).

performance ignores other influence factors in some ways and is thus vulnerable. Sophisticated methods and more complex models are of course able to capture reality better but will never acquire the requirements of those who criticize this kind of research. In other words, it is not possible to please everyone and to achieve every demand but this work shows how fertile this kind of research could be for practitioners as well as for the research on entrepreneurship and strategic management.

This thesis encounters the criticism of the research on success factors with a new kind of research framework that distinguishes success factors and specific success factors. Chapter 1 and figure 1.1 analyzed success factors in different life-cycle stages of the firm and for different organizational types. Thus, this research framework does not try to identify universal valid recipes for success, but, the aim is to deliver helpful insights for entrepreneurs and business owners in the organizations observed during the individual life-cycle stages. Obviously, the research studies in this thesis are theory driven and contribute to existing theory. The following two sections summarize the practical implications that have been gained in the three studies and discuss the contributions to the research on success factors for original and derivative ventures and SMEs. Additionally, it is debated if the empirical results for the different life-cycle stages can be applied for organizations in other life-cycle stages.

5.1 Research Contribution

Research Contribution for Original ventures

The first research study in the field of entrepreneurship concerns the relationship between team diversity and performance. The major research contribution provided by this study is that team diversity does have an impact on performance. Regarding the diverse research results it has not yet been possible, however, to verify a clear

positive or negative effect of team diversity on performance (Klotz et al. (2014), Chowdhury (2005), Ensley and Hmieleski (2005)) due to different input variables, the embedding context (Jackson et al. (2003)), time (how long teams stay together, Harrison et al. (1998)), and organizational culture (Brickson (2000), Ely and Thomas (2001)). This study tries to answer the question if team diversity really matters and discusses if it is possible to achieve this goal.

However, the use of a mediation model and the PLS method represent state of the art research for team diversity and both reveal that heterogeneous teams have the advantages of a better access to financial resources and social capital and, as a consequence, are more successful. Thus, this study adds empirical evidence to the ongoing debate to what extent homo- or heterogeneous teams perform better.[3] Furthermore, the results provide new insights into the measurement of team diversity constructs and the importance of team diversity items. In this mediation model heterogeneous *study programs and degrees*, *industrial experience*, and *nationality* have a positive impact on the firm's network and financial resources and thus, on firm performance that mainly confirms prior research (e.g. Klotz et al. (2014), Mathieu et al. (2008)) whereby it could be shown that the inclusion of *age* and the *quantity of team members* as diversity items to measure team diversity is problematic.[4]

As a result, the empirical evidence shows that team diversity is performance relevant if the interaction with the access to financial resources and the firm's network is analyzed for the special context of newly founded university spin-offs in the life-science industry. Therefore, the question should not be: Does team diversity really matter but rather: When does team diversity really matter? The research on team diversity and organizational performance should concentrate on mediation models that take different relationships into account. In this sense, the present study only

[3] Klotz et al. (2014) e.g. talk about a unresolved debate.

[4] This new insight base on complex statistical results from the PLS model that could analyzed in detail in section 4.1.6.

constitutes a first step to more sophisticated models that could be able to increase the knowledge about team diversity effects.

The unique context of university spin-offs in the biotechnology industry complicates the attempt to generalize the empirical findings for all kind of new venture teams. Regarding the research results it seems difficult to transfer the empirical findings into other organizational forms and life-cycle stages of the firm. Generally, founders of university spin-offs have unique histories and experience as well as specific human capital. Additionally, university spin-offs can be characterized by a high degree of innovation, low technological maturity, broad experience in research and development, good capabilities and conditions for implementing innovations etc.[5] Thus, a transfer of the research results appears not appropriate. However, the results regarding the interaction of team diversity with the access to financial resources and the firm's network strengthen prior empirical findings for these relationships (see section 4.1.3) and therefore these findings can be seen as well significant for other organizational forms too. Regarding the different life-cycle stages, these interactions should be as well important for the stage of firm growth because in this period the access to financial resources and broad networks can be seen as crucial as well. Business succession, on the other hand however, plays only a minor role for university spin-offs and therefore can be leaved unattended for these considerations.

Research Contribution for SMEs

The second life-cycle stage is characterized by firm growth of SMEs and this thesis emphasizes the use of incentives as important success factor. Regarding the HRM literature, there almost do not exist any empirical studies concerning the effects of incentives used in SMEs (exceptions are e.g. Behrends (2007), Behrends and Martin (2006)). At any rate, the application of incentive schemes is a highly complex

[5] This brief list of specific characteristics of university spin-offs is taken from Helm and Mauroner (2007) on page 239.

issue involving a great deal of uncertainty for the organizations concerned. The following small real life example taken from Frey and Osterloh (2002) demonstrates the possible effects for the firm's employees and, at the same time, organizational performance.

"Paying your child for taking out the garbage" usually has two effects. At the beginning, the job will be finished with passion and after a short while the effect changes. With a high probability, the incentive stimuli that motivated the child to take out the garbage leads now to the situation where the child either expects money for housework or that it is dissatisfied with the amount of the incentive. At the same time, the example shows that incentives and pay for performance can be harmful as well, especially for the individuals intrinsic motivation.[6] Regarding the unique context of SMEs the unconditional use of pay for performance appears at least dangerous.

The results show that the use of financial incentives known as pay for performance harm intrinsic motivation of the employees concerned. Furthermore, it can be shown that intrinsic motivation, nonfinancial incentives, and the social environment are key factors for SMEs to offer employees a different kind of workplace compared to big companies. Employees in SMEs[7] prefer a different kind of workplace that is characterized by a high degree of working individualism and little control that can be reached with a well developed social environment, and the use of nonfinancial incentives instead of financial ones. Despite the lack of resources SMEs are also capable to hire and retain high skilled workers if they offer an adequate remuneration with a high degree of nonfinancial incentives.

Thus, this study could be sorted to literature that uses a behavioral economics approach, shows the existence of a crowding-out effect, and criticizes the overall

[6] This effect is known as the crowding-out effect (Frey (1997), Frey and Jegen (2001), Deci et al. (1999)). For a detailed explanation look at section 4.2.2.

[7] This study concentrates only on high skilled workers. For detailed explanation look at section 4.2.

use of pay for performance (e.g. Bebchuk and Fried (2004), Rost and Osterloh (2009)). Additionally, it represents one of the rare empirical insights regarding the relationship between the use of incentives and firm performance for SMEs. As a consequence, the study emphasizes to reconsider the use of incentives for SMEs and to take the unique SME environment stronger into account in the HRM literature in order to investigate the effects of incentive schemes. Furthermore, the results emphasize the use of SME compliant incentives as a success factor during the stage of firm growth.

A transmission of these recommendations to other life-cycle stages of the firm in turn, appears of secondary importance. In the first life-cycle stage of new venture formation the number of employees is usually very small and the survival of the organization is the primary objective instead of the implementation of HRM strategies. Organizations in the third life-cycle stage normally already use incentive schemes whereby the recommendations for growing SMEs are principally transferable to organizations in the business succession phase. However, in this specific situation the exact timing of a remuneration change should be chosen carefully. As employees' remuneration is always a sensitive issue and therefore a premature change of the incentive scheme appears questionable for business succession.

Research Contribution for Derivative Ventures

The last life-cycle stage in this thesis describes the business succession. The research contribution to this particular stage concerns the effect of gender on organizational performance. The organizations observed in this life-cycle stage are all family firms and the relevant research in this field is still underrepresented and needs further attention (e.g. Brockhaus (2004), Jimenez (2009)).

Regarding the results it becomes inevitably clear that gender has no effect on performance for business succession in family firms. In this sense, the OLS regressions show

that there is no effect of gender on sales, employees, sales/employees, satisfaction, and growth prospects in business succession. Therefore, this thesis supports the existing gender discourse concerning family firms in business succession and reveals no gender differences in organizational performance. In addition to this contribution, the specific context of family firms the results are significant for the general gender discourse in entrepreneurship as well. Contrary to prior research which pursues the same approach (Kalleberg and Leicht (1991), Du Rietz and Henrekson (2000)) the data used are more appropriate to investigate the relationship between gender and performance. In this connection, Kalleberg and Leicht (1991) only have data of 411 companies in the computer sales and software, food and drink, and health industries in South Central Indiana in the US whereas Du Rietz and Henrekson (2000) have a huge sample and randomized data but do not discuss the problem of a possible self-selection effect. Thus, the empirical evidence given here that women are as good as men in managing business and especially business succession with rich European data shows that there are no rationale reasons for a gender gap in entrepreneurship.

The results of equal managing capabilities of men and women are universally valid for each life-cycle stage of the firm. Provided structural barriers women usually have to suffer from in the case of new venture formation (e.g. Brush (1992)) are eliminated as it is the case for business succession gender inequality will disappear. Under the same starting conditions it is not possible to observe different performance outcomes in male and female headed organizations. Thus, gender could be understood as a success factor for each life-cycle stage and every organizational form because women in managing positions are equally good as men and until now their potential is still not exhausted.

5.2 Practical Implications

Practical Implications for Original Ventures

The first study in this thesis points out that team diversity is positively related to performance for newly founded university spin-offs. Thus, selecting the right team can constitute a first and easy way to affect firm performance. It is worth highlighting the positive effects of team diversity on networks and the access to financial resources which in turn influence performance positively as a direct effect of team diversity on performance could not be observed. If teams are diverse they have access to a wider range of networks and are more attractive for external providers of equity and debt capital.

The PLS results reveal that especially diverse study programs and degrees, industrial experience, and nationalities have had a positive effect in the model. Insignificant diversity items are other titles, soft skills, private contacts, and the character. Therefore, the results highlight that especially functional diversity is an important success driver. Founders of research-based spin-offs should be aware of the possibility to influence performance already at an early stage of the business lifetime and to create a team that exhibits a high functional diversity. Capital providers are able to recognize the team composition and favor heterogeneous teams and diverse teams are capable to develop a better network for the organization. Regarding the imprinting hypothesis and its consequences (Stinchcombe (1965), Pennings (1980)) the team composition in the first life-cycle stage of the firm has even long-term performance effects. Once more, this emphasizes that new venture teams should be composed in a more heterogeneous way to be successful.

Practical Implications for SMEs

After new venture formation follows the life-cycle stage firm growth according to the research framework applied in this thesis. Due to the study results in chapter

4.2 various practical implications arise. SMEs suffer from diverse disadvantages in comparison to big companies that are e.g. a lack of resources, lower prominence on the labor market, and predominantly rural company locations. These disadvantages complicate the possibility to hire and retain high skilled workers and therefore could lead to a loss of productivity and competitiveness.

However, SMEs are able to compensate their disadvantages in comparison to big companies if they offer their employees a different kind of workplace and different incentives. Furthermore, the use of the appropriate incentive schemes can be understood as a sort of strategy to improve their position in the the war for talents. High skilled workers in SMEs prefer nonfinancial incentives and the special workplace conditions that can only be found in SMEs. Business owners and entrepreneurs can use this insight to adapt the incentive schemes to their employees' needs and thus enhance employee motivation and emerge as an attractive employer on the labor market. Based on this evidence, it is additionally possible to mitigate the shortage of talents by using the right incentives to gain highly qualified employees.

A further practical recommendation is that SMEs should not use financial incentives without a prior thorough examination of the associated effects. Regarding the possible negative effects of financial incentives such as the crowding out of intrinsic motivation and the complexity of using this incentives it is surprising that nearly 50% of all employees in SMEs are also remunerated according to pay for performance plans (see section 4.2.5). Thus, the question arises if SMEs really know what they are doing and therefore the study results could be used to create a better awareness for the effects of financial and nonfinancial incentives and to prevent a misuse.

Practical Implications for Derivative Ventures

The research study for derivative ventures in the third and last life-cycle stage of the firm provides practical implications that could have wide-reaching-consequences

for the economy and society as a whole. The results show that there exist no performance differences in managing business succession between men and women. The implications from these results have to be divided into recommendations for predecessors in family firms and policy makers in general.

Initially, the results reveal that predecessors' fears of handing over their business to a female successor (e.g. Dumas (1988), Dumas (1990)) is irrational. Furthermore, there exists a huge waste of potential if females in general are stigmatized as underperforming and if they are ignored as potential successors. Even if there is still no dangerous lack of successors in Germany (Müller et al. (2011)) the limited pool of candidates complicates the selection of an appropriate successor. The study results unequivocally indicate that females are equally able to manage business succession and therefore should be considered as suitable successors.

Further implications concern the under-representation of females in business and managing positions in general. The study can be used as basis of decision making for policy makers to change the still unsatisfactory situation of a male-dominated society and economy. If prejudices against women in management positions do not disappear over time policy makers have to take action. The "female quota" represents only one possibility policy makers have to change the current situation. Further solutions could be specific support programs, marketing activities or a stronger media reporting to draw attention to gender equality.

Regarding the current demographic changes in many European countries, especially in Germany and the related consequences (Kay and Richter (2010), Kay (2012), Kay and Suprinovic (2013)) the consideration of women in managing positions and business succession appears crucial for the economy and wealth creation. As a whole, predecessors and policy makers should use the study results to increase their efforts to achieve gender equality.

Eidesstattliche Erklärung

Hiermit versichere ich an Eides statt, dass ich die Dissertation selbständig und ohne Inanspruchnahme fremder Hilfe angefertigt habe. Ich habe dabei nur die angegebenen Quellen und Hilfsmittel verwendet und die aus diesen wörtlich oder inhaltlich entnommenen Stellen als solche kenntlich gemacht. Die Hilfe einer Promotionsberaterin / eines Promotionsberaters habe ich nicht in Anspruch genommen. Die Arbeit hat in gleicher oder ähnlicher Form noch keiner anderen Prüfungsbehörde vorgelegen. Ich erkläre mich damit einverstanden, dass die Arbeit mithilfe eines Plagiatserkennungsdienstes auf enthaltene Plagiate überprüft wird.

Datum Unterschrift

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