

Unravelling the Patterns in Venture Creation Processes

Lukas Held

UNRAVELLING THE PATTERNS IN VENTURE CREATION PROCESSES

Lukas Held

ISBN: 9789463237406

Copyright © 2019, Lukas Held

Cover design and layout: © evelienjagtman.com

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, without prior written permission by the author
Unravelling the Patterns in Venture Creation Processes

UNRAVELLING THE PATTERNS IN VENTURE CREATION PROCESSES

(met een samenvatting in het Nederlands)

Proefschrift

ter verkrijging van de graad van doctor aan de Universiteit Utrecht op gezag van de rector magnificus, prof.dr. H.R.B.M. Kummeling, ingevolge het besluit van het college voor promoties in het openbaar te verdedigen op vrijdag 13 september 2019 des middags te 12.45 uur

door

Lukas Held

geboren op 23 september 1986
te Bonn – Bad Godesberg, Duitsland

Promotor: Prof. dr. K. Frenken

Copromotor: Dr. A.M. Herrmann

This thesis has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 649378.

CONTENTS

1. Introduction	9
1.1 Research Question	13
1.2 How to Approach the Study of Venture Creation Processes	14
1.3 Methodological approach	16
1.4 The dataset	19
1.5 Thesis outline	20
2. Part-time Entrepreneurship: The Role of Institutions, Venture and Individual Characteristics in Entry and Transition Choices	25
2.1 Introduction	27
2.2 Theory	29
2.2.1 Real options perspective on full-time entrepreneurial entry	29
2.2.2 The characteristics of part-time entrepreneurship in the light a real options perspective	30
2.2.3 Entrepreneur-level factors and part-time entrepreneurship	32
2.2.4 Venture-level factors and part-time entrepreneurship	34
2.2.5 Institutional framework and part-time entrepreneurship	36
2.2.6 The entry choices of joining entrepreneurs	39
2.3 Methods	40
2.3.1 Data	40
2.3.2 Measures	41
2.3.3 Estimation	43
2.4 Results	45
2.4.1 The initial choice between part-time and full-time entry to entrepreneurship	45
2.4.2 The transition from part-time-time to full-time entrepreneurship	49
2.5 Discussion & Limitations	53
2.5.1 Discussion	53
2.5.2 Limitations	55

3. Team Formation Processes in New Ventures	57
3.1 Introduction	59
3.2 Theory	62
3.3 Methodology	70
3.3.1 The Data: Sample and Operationalization	70
3.3.2 Analyses	73
3.4 Results	77
3.4.1 Patterns in team formation processes	77
3.4.2 Correlations between Founder, Employee, and Service Provider Involvement	80
3.4.3 Determinants of Approaches towards Founder, Employee, and Service Provider Involvement	83
3.5 Discussion and Conclusions	87
4. Follow the Money: The Funding Acquisition Process of Nascent Ventures	91
4.1 Introduction	93
4.2 Theory	97
4.2.1 Funding options of nascent ventures	97
4.2.2 Financial Bootstrapping	97
4.2.3 Pecking-Order Theory (POT)	98
4.2.4 Determinants for nascent ventures' going beyond financial bootstrapping	100
4.3 Methodology	102
4.3.1 The Data: Sample and operationalization	102
4.3.2 Analyses	107
4.4 Results	111
4.4.1 Funding types and sources	111
4.4.2 Patterns in funding acquisition processes	112
4.4.3 Determinants of approaches to the Funding Acquisition Process	115
4.5 Discussion and Conclusions	119

5. Whom do Nascent Ventures search for? Variance of Linkage Formation Activities during New Product Development Processes	123
5.1 Introduction	125
5.2 External Linkage Formation by Nascent Ventures in New Product Development	128
5.2.1 New product development and patterns of external linkage formation	128
5.2.2 Strategic needs and external linkage formation patterns of nascent ventures	129
5.2.3 Opportunities and external linkage formation pattern of nascent ventures	130
5.3 Methods and Data	133
5.3.1 The Data: Sample and operationalization	133
5.3.2 Measures	134
5.3.3 Econometric model and estimation method	138
5.4 Results	142
5.4.1 Patterns in New Product Development Processes	142
5.4.2 Circumstances of External Linkages in New Product Development Processes	143
5.5 Discussion and Conclusions	147
6. Conclusions	151
6.1 Main Contributions	153
6.2 Literature	154
6.3 Method & Data	158
6.4 Limitations	159
6.5 Next steps in research on the venture creation process	161
References	165
Appendix	183
Summary	189
Samenvatting	195
Acknowledgments	201
Curriculum Vitae	207



CHAPTER 1

Introduction

INTRODUCTION

Three decades after Van de Ven et al. (1989) described in an extensive case study how the process of venture creation can play out over time and stressed the need to '*identify the feasible sets of paths in new business creation*' (Van de Ven et al., 1989, p. 296), entrepreneurship literature still does not provide a cohesive set of venture creation processes. While it is now widely recognized that entrepreneurship and venture creation are not singular acts, but rather processes that take place over time (Brush et al., 2008b; Delmar and Shane, 2003; Dimov, 2018; McMullen and Dimov, 2013), we still lack a detailed understanding of what typical processes look like in venture creation and under what circumstances each of these processes is more or less likely to occur.

In response to Van den Ven et al. (1989) and others at the time (Gardner 1988), a multitude of perspectives and models have been used to explore the venture creation process (Moroz and Hindle, 2012). Two particularly prominent ways of modelling the venture creation process are stage and gestation activity models (Dimov, 2018; Levie and Lichtenstein, 2010). While both types of models try to uncover a unifying venture creation process, they do so under very different premises. Stage models assume that all ventures not only go through the same fixed number of stages in their development, but also do so in a prescribed sequence. Gestation activity models in contrast focus on the activities carried out by the entrepreneur in order to identify a number or a sequence of gestation activities that result in the creation of ventures (Moroz and Hindle, 2012).

Whereas the stage model concept has convincingly been discarded as too prescriptive (Levie and Lichtenstein, 2010), the gestation concept continues to receive attention in numerous publications that are based on the Panel Study of Entrepreneurial Dynamics (PSED) (for an overview see Frid et al., 2018). Most of these studies try to analyse venture creation along one or more of these three dimensions: the number of gestation activities that lead to venture creation, which specific gestation activities lead to venture creation and which sequence of gestation activities lead to venture creation (Arenius et al., 2017). In relation to the number of completed gestation activities, there is little consensus beyond the fact that a positive relationship exists between the number of completed gestation activities and the creation of a venture (Carter et al., 1996; Lichtenstein et al., 2007). Pertaining to the type of activities carried out, some authors attach a special importance to specific gestation activities, for example business planning (Delmar and Shane, 2003). In addition, Liao and Welsch (2008) find that some activities, like defining a market opportunity, are commonly carried out across different types of ventures. Nevertheless, neither a single gestation activity, nor a group thereof has been identified as a sufficient condition for the creation of ventures (Arenius et al., 2017). As a consequence, no lists or sequences of gestation activities that describe venture

creation processes in a conclusive way have emerged (Arenius et al., 2017; Brush et al., 2008b; Davidsson and Gordon, 2012; Dimov, 2018). Therefore, the research on the venture creation process is somewhat 'stuck' between the overly coarse and prescriptive stage models and seemingly eclectic lists of singular gestations activities.

1.1 RESEARCH QUESTION

The failure to capture the venture creation processes using a stage or gestation approach has prompted various entrepreneurship scholars to call for studies that focus on the process in its entirety as the unit of analysis and for the use of methods that are appropriate when exploring a process (Hjorth et al., 2015; McMullen and Dimov, 2013). The focus of existing research on singular events and process outcomes often leads to the use of methods that are ill-suited for studying processes (Langley et al., 2013; Van de Ven and Engleman, 2004). Therefore, the lack of progress in studies on entrepreneurship as a process has at least partially methodological origins. In Aldrich's (2001) conceptualization of outcome-driven (or variance) explanations versus event-driven (or process) explanations, most studies on venture creation rely on methods that provide outcome-driven explanations. While outcome-driven studies are suitable to explain change through deterministic causation, process studies consider how events together form one process (Dimov, 2018; Poole et al., 2000). Because most publications in the field of venture creation have employed variance explanations, they are able to answer questions about antecedents and outcomes of the entrepreneurial process, but little progress has been made to explain how said process unfolds (McMullen and Dimov, 2013; Ruef, 2005; Van de Ven and Engleman, 2004). To tackle this gap, this dissertation addresses the following two research questions:

1. *Do the activities undertaken throughout the venture creation period manifests themselves in a single, uniform process, in a distinct number of processes, or in an entirely random way?*
2. *To the extent that distinct processes of venture creation can be identified, what factors then explain that one rather than another process is pursued?*

I aim to answer these research questions through the introduction of a novel method that explicitly allows the exploration of longitudinal process data. In order to fully exploit the advantages of this method a dataset that is uniquely suited to such analyses is collected as part of this thesis. Before describing method and dataset in greater detail, I elaborate on how I approach studying the venture creation process, namely by dividing it into sub-process, and the different theories I draw on to do so.

1.2 HOW TO APPROACH THE STUDY OF VENTURE CREATION PROCESSES

Dimov (2018) contends that the entrepreneurial process has a nested structure and consists of sub-processes which in turn can be further broken down into sub-process and activities. The research based on the Panel Study of Entrepreneurial Dynamics dataset tries to account for this fact by recording the sequence of singular gestation activities, which together are thought to make up the venture creation process (Gartner et al., 2004). It has become increasingly clear, that this low level of aggregation introduces too much heterogeneity to allow meaningful patterns in venture creation to emerge (Brush et al., 2008b; Davidsson and Gordon, 2012). Building on this insight, I seek to aggregate the activities that take place throughout venture creation to the most central sub-processes of the venture creation process. But what exactly are these most crucial sub-processes that allow one to analyse venture creation at the right level of aggregation?

The resource based view (RBV) established that firms are a bundle of resources and that those resources in turn determine which strategic options the firm has and how it can establish a competitive advantage (Barney, 1991; Penrose, 1959). In the context of venture creation, it is then one of the main objectives of an entrepreneur to acquire and configure the resources needed to realize the opportunity she identified (Brush et al., 2008b; Newbert, 2005; Ucbasaran et al., 2001). The acquisition of three specific types of resources is identified as crucial in the creation and development of every venture: (1) human resources, (2) financial resources and (3) information or knowledge (Brush et al., 2008b, 2002; Herrmann, 2019; Katz and Gartner, 1988).

This thesis sheds light on the venture creation process by describing and analysing the three sub-processes that lead to the acquisition of these central resources in larger detail: (1) the team formation process, (2) the funding acquisition process and (3) the new product development process. Extending previous frameworks, I also draw on the RBV literature to gain a better understanding when and how ventures engage in acquiring each respective resource. And, as each of the sub-processes has distinct features and logics, I also mobilize supplementary theoretical perspectives to explore the sub-processes in greater detail.

In case of the team formation process and the new product development process, I employ literature on the Varieties of Capitalism (VoC) to gauge the influence of different institutional frameworks on the respective process. The VoC literature takes a relational view on the firm and posits that firms need to establish relationships with various actors in different spheres in order to solve the coordination problems it faces, e.g. to acquire human capital or knowledge. Different institutional frameworks lower or increase the costs of different coordination

mechanisms, for example competition or collaboration, and thus induce firms to choose for one form of coordination rather than another (Hall and Soskice, 2001). In particular, I follow the VoC literature in distinguishing between Liberal Market Economies (e.g., United States), Coordinated Market Economies (e.g., Germany) and Mixed Market Economies (e.g., Italy). This particular form of variety is expected to influence when, how and if ventures interact with external actors and thus how team formation and new product development processes take shape in ventures across various institutional frameworks.

With regard to the funding acquisition process I employ literature on the Pecking Order Theory (POT) and financial bootstrapping to specify how the ability and need to acquire different types of financial resources shapes the funding acquisition throughout the venture creation process. Each of these two perspectives formulates different expectations when and how ventures acquire different types of funding.

1.3 METHODOLOGICAL APPROACH

The aim of this thesis is to uncover patterns in venture creation processes and their sub-processes. I want to understand whether typical approaches to team formation, funding acquisition and linkage formation exist amongst nascent ventures. If indeed, they exist, I want to explore what these typical approaches look like in terms of carried out activities, sequence of activities, as well as process length. What is needed to achieve these objectives, is a method that allows me to explore and compare a large number of venture creation processes. The methods that have been widely deployed in the exploration of venture creation processes, namely case studies or outcome-driven methods (Aldrich, 2001) like survival analyses and logistic regressions, are not capable of delivering such insights (Biemann and Datta, 2014). These methodological shortcomings contribute to the lack of understanding of the venture creation process, as discussed above. Case studies enable researchers to study venture creation processes in great detail, however the number of ventures covered in these studies is small (see Reymen et al., 2015; Van de Ven et al., 1989). As a result, the ability to uncover broader patterns in venture creation processes based on case studies is limited. Both, survival analyses and logistic regressions are capable of analysing a larger number of venture creation processes. However, in either case the ability to analyse a larger N comes at the expense of analysing a process in its entirety (Biemann and Datta, 2014). Survival analyses calculate the likelihood of an event to occur at any point of a venture creation process (for example Hechavarría et al., 2016). From this it follows that survival analyses are suited to explain temporal aspects of venture creation, however are only capable of doing so for singular activities or events. Logistic regressions on the other hand allow to uncover the correlation between venture characteristics and the occurrence of gestation activities or outcomes of venture creation (for example Davidsson and Honig, 2003; Dimov, 2010). This type of outcome-driven analysis (Aldrich, 2001) subsequently sheds light on a select few moments of the venture creation process or the outcome of the venture creation process, rather than the process itself (Dimov, 2018).

It is obvious then that, if we want to uncover patterns in venture creation processes, different, event-driven methods (Aldrich, 2001) need to be introduced to entrepreneurship research. Methods, which allow us to explore how a large number of venture creation processes unfold over time. One method uniquely suited to serve this purpose is optimal matching, a method used in social sciences to analyse sequences (Abbott and Tsay, 2000; Aisenbrey and Fasang, 2010). Unlike the methods that were previously employed to explore the process of venture creation, optimal matching treats the entire sequence of activities which form a particular process as the unit of analysis (Abbott and Tsay, 2000; Stovel and Bolan, 2004). The basic idea of optimal matching is to calculate how similar sequences in a sample are to each other by counting the transformation steps it takes to transform one sequence of events into another (Abbott and Tsay, 2000). Based on comparing entire sequences of events rather than the occurrence of singular

events (Abbott and Tsay, 2000; Stovel and Bolan, 2004), optimal matching facilitates uncovering common patterns in organizational processes (Abbott and Hrycak, 1990; Biemann and Datta, 2014). It is therefore a particularly promising method to explore patterns in processes like that of the creation of ventures (Aisenbrey and Fasang, 2010).

Despite the promise optimal matching has to offer to organizational research, its application within social science has largely been limited to research on career paths (Biemann and Datta, 2014; for exceptions see Gordon, 2012; Jaspers and Hak, 2013). The limited usage of optimal matching can be ascribed to both the sometimes complex choices the method requires researchers to make, as well as researchers simply not being familiar with the method (Biemann and Datta, 2014). With this thesis I provide an example for management researchers in general and entrepreneurship researchers in particular how optimal matching can be fruitfully applied in the context of organizational processes. In the following paragraph, I briefly introduce the most common manner in which optimal matching is used in social science, as well as a modification I have developed as part of this thesis to optimize the method for the analysis of organizational development processes.

Although different ways of conducting optimal matching analysis exist, one dominant approach has emerged in social science (Aisenbrey and Fasang, 2010). This approach combines an optimal matching analysis with clustering techniques to arrive at clusters that embody the most representative processes found in a sample (for an example see Biemann and Datta, 2014). The approach consists of four steps, which are: (1) coding the data, (2) defining transition costs, (3) calculating the similarity of each pair of sequences and (4) cluster the sequences based on their similarity. The clustering allows to identify common patterns in the analysed process (Halpin, 2010). In addition, the membership in a cluster can serve as the dependent variable in logistic regressions. The regression analyses then explore which characteristics of the subject that went through the researched process, in this thesis ventures, correlate with a particular type of process.

In this thesis, I follow this established way of executing an optimal matching analysis, but introduce a novel solution to an often voiced concern about the third step of the analysis, namely how optimal matching deals with sequences of unequal length (Aisenbrey and Fasang, 2010; Wu, 2000). Optimal matching has been widely used to solve biological questions, such as the analysis of genome sequences. In this context optimal matching calculates how similar two strings of DNA are by counting how many transformation steps it takes to transform the first string of DNA into the second one. As outlined above, more recently it has been introduced to sociology in general and research on career patterns in particular (Abbott and Hrycak, 1990; Blair-Loy, 1999; Dlouhy and Biemann, 2015; Pollock, 2007; Stovel and Bearman, 1996). Unlike genome sequences however, social processes such as the venture creation process and its sub-processes

can differ in length (Aisenbrey and Fasang, 2010; Wu, 2000). This is especially problematic if the difference in length is, at least partially, caused by right-censored data, i.e. not all processes in a dataset were observed in their entirety (Aisenbrey and Fasang, 2010). Since I do not observe the end of the venture creation process for all cases, I was faced with this exact problem.

The most common approach to this problem in optimal matching studies is to equalize the length of sequences by deleting or inserting states. This approach solves the problem of unequal sequence lengths, but introduces the question of how to determine the cost of such operations (Aisenbrey and Fasang, 2010; Stovel and Bolan, 2004) and distorts the flow of time within the process (Lesnard, 2010). Since the timing of activities is a key property of the venture creation process, I introduce a modification to optimal matching that maximizes the amount of information used in the analysis, while abstaining from deleting or inserting states as proposed by Aisenbrey and Fasang (2010) in such cases: When I calculate the distance between two sequences of unequal length, I shorten the longer of the two sequences to match the shorter one in length. To provide a simple example: Assuming I calculate the distances between the fictional sequences S1 consisting of the states A-B-A, S2 (A-B-B-A), and S3 (A-B-B-B-A), I am faced with the problem that S1 has a length of three, S2 a length of four and S3 one of five. In my solution, I base the distance calculation between S1 and either of the longer sequences only on the first three states of each sequence, because I only have information on the first three states of S1. However, when I calculate the distance between S2 and S3, the shorter of the two sequences (S2) is four states long. Consequently, I use the first four states of S3 in this distance calculation. By means of this dynamic truncating, the maximum amount of available information is used in every pairwise distance calculation, while maintaining the temporal order of sequences. In addition, I standardize the measured distances to make them comparable.

Taken together, optimal matching constitutes a methodology that corresponds in its process focus with the process nature of venture creation (Gartner, 1985; Van de Ven and Engleman, 2004). Therefore, optimal matching, modified as described above, addresses the lack of adequate methods to explore venture creation processes and allows me to answer the repeated calls for studies that explore the venture creation process itself, rather than its outcomes (Aldrich and Ruef, 2006; Hjorth et al., 2015; Van de Ven and Engleman, 2004).

1.4 THE DATASET

As outlined in the previous section, few studies exist that have employed sequence analysis in the context of venture creation (Gordon, 2012; Jaspers and Hak, 2013). These studies are based on the PSED dataset, the most detailed dataset on the creation of ventures to date. The PSED dataset is commendable large, covers multiple countries and records activities of venture creation in great detail. However, with regard to analysing the venture creation process in its entirety, it has a distinct disadvantage: It mostly records the points in time when a large number of singular events and gestation activities occurred in the creation of a venture (e.g. the date when the first employee was hired). The type of data best used in optimal matching, on the other hand tracks which state, out of a limited number of possible states, a particular activity takes on for every point in time for the entire time span of the observed process (Biemann and Datta, 2014). Examples of this are the employment status in career path research or the number of employees in the context of venture creation. Because of these data limitations the existing studies which deploy optimal matching to explore the venture creation process have been limited to coarse analyses of the process. Gordon (2012) for example distinguishes venture creation processes based on the order in which discovery and exploitation activities are mainly carried out.

No dataset containing the type of longitudinal information on venture creation exists presently, that would allow me to fully exploit the advantages of optimal matching. Therefore, a unique dataset on the venture creation process was collected for the purpose of this thesis. The data collection explicitly focused on longitudinal process data rather than outcome data in order to allow the application of the optimal matching methodology as described above. As a result, the dataset tracks how the venture creation process of 870 nascent ventures unfolds over time. The data covers the venture creation from the moment one of the founders verbalized the intention to create the venture, until the point the venture reached sustained profits, was acquired or closed down. In order to capture possible variations in venture creation processes, founders of ventures of all legal forms (excluding sole proprietorship) that were active in the information and communication technology (ICT) and renewable energy (RE) industries in Germany, Italy, the US, The Netherlands and the UK were interviewed.

The dataset tracks the acquisition of the three crucial types of resources as follows: With regard to (1) team formation the number of founders, employees and service providers working on the creation of the venture is tracked. The (2) funding acquisition processes records which type of funding (equity, debt, grant) was acquired from which sources (founders, insiders, external) throughout the venture creation process. Lastly, the dataset contains information on those ventures that (3) developed a product in which months they did so in-house or rather in collaboration with external market or research linkages.

1.5 THESIS OUTLINE

The remaining chapters of this study exploit the unique process orientation of the collected dataset, with chapter 2 exploring the issues of part-time entrepreneurship in detail. This chapter is followed by chapter 3 on team formation processes, chapter 4 on funding acquisition processes and chapter 5 on linkage formation in new product development processes. Each of the chapters will answer a sub question to the overall research question (Table 1.1). And, while chapter 2 relies on survival analysis with the founder as the unit of analysis, chapters 3 to 5 are united in the use of optimal matching with the venture as the unit of analysis (Table 1.2).

Table 1.1 Chapters and Research Questions

Chapter	Chapter Title	(Sub) Research Question
1	Unravelling the Patterns in Venture Creation Processes - Introduction	Do processes throughout the venture creation manifests themselves in a single, uniform process, in a distinct number of processes or in entirely unordered way?
2	Part-time Entrepreneurship: The Role of Institutions, Venture and Individual Characteristics in Entry and Transition Choices	To what extent do institutional and venture-level factors influence an entrepreneur's choice between part-time and full-time entry to entrepreneurship and the likelihood of a part-time entrepreneur to transition to full-time entrepreneurship?
3	Team Formation Processes in New Ventures	Do distinct types of team formation processes exist, how do they differ, and which structural characteristics can explain these differences?
4	Follow the Money: The Funding Acquisition Process of Nascent Ventures	Do nascent ventures pursue different approaches to funding acquisition and, if so, how do these processes look like and which circumstances explain that ventures choose to pursue one rather than another finance acquisition process?
5	Whom do Nascent Ventures search for? Variance of Linkage Formation Activities during New Product Development Processes	Do distinct sequences of linkage formation to external partners during new product development processes of nascent ventures exist, how these sequences differ over time, and which circumstances explain the venture's choice to pursue one rather than another process
6	Conclusions	What does the study of part-time entrepreneurship and the sub-processes of team formation, funding acquisition and the product development teach us about the process of new venture creation? And, what further research questions follow from the study?

The second chapter explores the entry process of individual entrepreneurs in larger detail. Drawing on the real options theory, I analyse which contextual factors on the level of the entrepreneur, the venture and the institutional framework induce an entrepreneur to enter entrepreneurship in either part-time or full-time. In a second step, I use a survival analysis to study the influence of the same factors on the transition behaviour of those entrepreneurs who started their venture on a part-time basis.

Chapter 3 explores the team formation process and makes use of a variety of human resource management theory arguments, as well as accounting for insights from the VoC literature. Notably, this chapter broadens the approach taken by most of the existing literature and not only analyses how the team of founders evolves but extends the team concept to include both employees and service providers in the team formation process.

Chapter 4 addresses the funding acquisition process of ventures by drawing on the Pecking Order Theory and the financial bootstrapping literature. In this context, I investigate to what extent a nascent venture receives funding beyond the funding provided by its founders. If it does receive further funding, I explore which factors drive the preference for a certain type or source of funding.

Hereafter, in chapter 5, I combine findings from organizational learning theory with the resource-based view and VoC to describe the linkage formation throughout the new product development process of nascent ventures. This chapter explores under which circumstances nascent ventures limit their new product development process to an in-house process and what drives them to form market or research linkages with external partners to advance the development of their new products.

Table 1.2 Overview of Unit of Analysis, Theories and Methods per Chapter

	Part-time Entrepreneurship (Chapter 2)	Team Formation (Chapter 3)	Funding Acquisition (Chapter 4)	Linkage Formation (Chapter 5)
Perspective				
Process	✓	✓	✓	✓
Unit of Analysis				
Entrepreneur	✓			
Venture		✓	✓	✓
Theory				
Resource-Based View (RBV)		✓	✓	✓
Varieties of Capitalism (VoC)	✓	✓		✓
Pecking Order Theory			✓	
Financial Bootstrapping			✓	
Organizational Learning				✓
Real Option	✓			
Method				
Survival Analysis	✓			
Optimal Matching		✓	✓	✓

Regarding chapter 3 to 5, it should be noted that the main contribution lies in the description of the patterns that exist in the respective sub-process. In other words, I explore which processes are most commonly followed by nascent ventures with regard to team formation, funding acquisition and new product development. The results of these analyses will thus provide an answer the first Research Question: *Do processes throughout the venture creation manifests themselves in a single, uniform process, in a distinct number of processes or in an entirely unorderly way?*

In addition to this explorative contribution, each of these chapters sheds light on the circumstances under which each of the distinct processes is the most likely to emerge. Similarly, chapter 2 investigates the factors which influence the transition process from part-time to full-time entrepreneurship. The results of these analyses will then provide an answer to the second Research Question: *To the extent that distinct processes of venture creation can be identified, what factors then explain one or the other process to occur?*

In answering both research questions each individual chapter, as well as the overall thesis, make substantial theoretical contributions to the literature on the respective sub-process of venture creation and the literature on the venture creation process in general. The contributions to the different strands of literature are highlighted in the following chapters, before I summarize and

discuss the contributions made by this thesis to the broader literature and debates on venture creation in the concluding chapter.

Lastly, I would like to point out that the chapters of this thesis have profited immensely from the contributions made by my supervisors, co-authors and colleagues. The following table (Table 1.3) provides an overview over contributions they made to each chapter.

Table 1.3 Contributions of other Authors

	Part-time Entrepreneurship (Chapter 2)	Team Formation (Chapter 3)	Funding Acquisition (Chapter 4)	Linkage Formation (Chapter 5)
Concept & Theory		Andrea Herrmann	Andrea Herrmann, Friedemann Polzin	Andrea Herrmann, Cornelia Storz
Analysis & Method	Jaap van Slageren*	Allard van Mossel		
Feedback	Koen Frenken*, Andrea Herrmann*	Koen Frenken*	Koen Frenken*	Koen Frenken*
Publication Status	Submitted (SEJ)	Published (SBEJ)	Re-Submitted (JBV)	Submitted (SBEJ)

*Not a co-author, acknowledged in the acknowledgement segment of the respective article.



CHAPTER 2

Part-time Entrepreneurship: The Role of Institutions, Venture and Individual Characteristics in Entry and Transition Choices

This chapter is based on: L. Held: Part-time Entrepreneurship: The Role of Institutions, Venture and Individual Characteristics in Entry and Transition Choices. Submitted to *Strategic Entrepreneurship Journal*.

ABSTRACT

Part-time entrepreneurship is gaining importance, both, as an occupational choice and as a low barrier entry option to entrepreneurship. Despite its increasing empirical relevance, the drivers of an entrepreneur's choice for a part-time entry to entrepreneurship remain understudied. This is particularly true for context factors outside of the entrepreneur herself, i.e. factors on the level of the venture and the institutional framework. I address this gap by analysing the drivers in the entry choice of 1182 entrepreneurs. On the basis of the real options theory, I formulate and test hypothesis how factors on the level of the entrepreneur, the venture and the institutional framework influence the initial choice of entrepreneurs between an entry in part-time or full-time, as well as the subsequent transition decision of part-time entrepreneurs. I extend the existing part-time entrepreneurship literature by showing that factors on all three levels play a significant role in the real option considerations of entrepreneurs. Furthermore, I show that founders who are original founders differ in their entry behaviour from those who join a venture at later stage.

2.1 INTRODUCTION

In the increasingly fragmented and flexible labour markets of western countries (Biemann et al., 2012; Sullivan, 1999; Sullivan and Baruch, 2009; Valcour and Tolbert, 2003) the phenomenon of part-time entrepreneurship plays an increasingly prominent role in occupational choices. The Global Entrepreneurship Monitor reports that part-time entrepreneurship makes up between 20 and 50 percent of early-stage entrepreneurial activities across different countries (Bosma et al., 2008). In a more detailed analysis of single country data, Buddensiek et al. (2013) find that the share of part-time entrepreneurs amongst all self-employed has doubled in Germany between 1991 and 2011 from 10.5% to 20.9%.

Despite the prevalence of part-time entrepreneurship, the entrepreneurship literature traditionally regards the entry to entrepreneurship as a dichotomous choice: a choice between deference or non-entry (employment) and full-time entry (Burke et al., 2008; Folta et al., 2010). This entry decision is often viewed as an investment decision under uncertainty within a real options framework. The real options consideration of entrepreneurs is found to depend on four parameters in addition to the attractiveness of the entrepreneurial opportunity: the opportunity and switching costs of the entrepreneur, the irreversibility of the investment and the uncertainty of the opportunity. These parameters are in turn shaped by macro-economic factors in addition to the characteristics of the venture and the entrepreneur herself (O'Brien et al., 2003).

A small but growing number of studies started to unpack the “*not only inaccurate, but also misleading*” (Burke et al., 2008, p. 94) dichotomous choice between entrepreneurship and wage work by exploring part-time entrepreneurship as a third entry option in this real option consideration (Wennberg et al., 2006). Most of these studies focus on characteristics of the entrepreneur herself as determinants of whether an entrepreneur creates a venture in part-time or full-time. For example, the motives (Block and Landgraf, 2016), risk appetite and self-evaluation (Raffee and Feng, 2014), as well as financial constraints of the entrepreneur (Petrova, 2012) have been studied in relation to part-time entrepreneurship.

Despite this encouraging progress in research on part-time entrepreneurship, glaring research gaps remain. Due to the prevalent focus on micro-level determinants at the level of the entrepreneur herself, characteristics of the created venture and its institutional environment have largely been ignored as determinants for entering entrepreneurship in part-time or full-time. However, part-time and full-time entrepreneurship have been shown to be two different kinds of entrepreneurship (Raffee and Feng, 2014), with different drivers and outcomes. Therefore, we need to understand what factors, at what levels drive the choice between the two entry options. Identifying the drivers behind part-time and full-time entrepreneurship will highlight the diversity in the population of entrepreneurs and the need to distinguish between different groups of entrepreneurs in future research.

In addition, it has been recognized by some that the choice between part-time and full-time entrepreneurship is not a singular choice. Rather, entrepreneurs may transition between these states over time (Block and Landgraf, 2016; Raffiee and Feng, 2014; Thorgren et al., 2016; Wennberg et al., 2006). In particular, one may ask which type of part-time entrepreneurs are especially likely to increase their time commitment over time and eventually become full-time entrepreneurs. The effects of macro-level and venture-level determinants remain understudied in this context as well.

My research question holds:

To what extent do institutional and venture-level factors influence an entrepreneur's choice between part-time and full-time entry to entrepreneurship and the likelihood of a part-time entrepreneur to transition to full-time entrepreneurship?

The objective of this study is to extend the literature on part-time entrepreneurship through researching the effects of institutions and venture characteristics on the real options entry heuristic of entrepreneurs. I do so by hypothesizing how these factors influence the initial entry, as well as the subsequent transition choice. I test the respective hypotheses in logistics regression and Cox regression models.

The paper is structured as follows. In section 2, I review the existing literature on entrepreneurial entry with a focus on the real options choice between part-time and full-time entry. Based on this review, I develop a number of hypotheses concerning the influence of venture characteristics and the institutional setting on this choice. The subsequent section outlines which measures and methods are used to test the hypotheses. Section 4 discusses the results of the regression models. In the final section, I discuss how these results contribute to the part-time entrepreneurship literature, as well as the literature on national institutions with regard to nascent ventures. I close by describing the paper's limitations and future steps for research.

2.2 THEORY

2.2.1 Real options perspective on full-time entrepreneurial entry

The real options theory contends that an investment under uncertainty and with irreversible costs is best viewed as the equivalent of a call option on making the investment. Such a perspective on an investment stresses two things. First, that the investor when making an investment, thus exercising her option on the investment, risks the irreversible portion of her investment. Second, that delaying the investment decision and learning more about the investment opportunity might be more valuable than making the investment immediately to avoid potentially higher investment costs in the future. The potential investor, or option holder, will try to exercise the option in such a way that she limits her downside risk and maintains the upside value through delaying or staggering the investment (Abel et al., 1996; Dixit and Pindyck, 1994).

It is hard to imagine an investment decision that is rife with uncertainty and irreversible investments than the entry to entrepreneurship. As such, the decision to enter entrepreneurship constitutes an investment option in the logic of the real options theory (O'Brien et al., 2003). In a real option consideration of the entry decision, the entrepreneur will exercise the option to enter entrepreneurship only, if she expects that the monetary and non-monetary benefits of entrepreneurship exceed those of other employment arrangements (O'Brien et al., 2003; Wennberg et al., 2006). Beyond the expected value of the entrepreneurial opportunity, four parameters have been identified to inform this real option consideration: the opportunity (1) and switching (2) costs of the entrepreneur, as well as the irreversibility of the investments required (3) to realize the opportunity and the uncertainty of the entrepreneurial opportunity (4).

The *opportunity costs* (1) are defined by the income, for example through wage work, that an entrepreneur forgoes when she exercises the option to enter entrepreneurship. The lower the opportunity costs, the less attractive the deference option becomes vis-à-vis the entry option. In other words, the lower the opportunity costs, the more likely the person is to enter entrepreneurship (Amit et al., 1995). *Switching costs* (2) constitute the costs that a switch from wage work to entrepreneurship causes and include, amongst other things, lost social security and seniority benefits or firm- and industry-specific experience (Folta et al., 2010). The higher these switching costs are, the less attractive it becomes for a potential entrepreneur to opt for an entry to entrepreneurship. The higher the *investment* (3) that an entrepreneur needs to commit to realize an entrepreneurial opportunity, the more risky and unattractive the opportunity becomes. O'Brien et al. (2003), however, argue that investments are only taken into an entrepreneur's consideration if they are irreversible. In other words, investments only negatively influence an entrepreneur's entry likelihood to the extent that these cannot be salvaged if the entrepreneur decides to exit entrepreneurship again. Lastly, an entrepreneur will only exercise her option to enter entrepreneurship if she is confident that the opportunity

can compensate her adequately for the risk she is taking by making the uncertain investment (O'Brien et al., 2003). The higher the *uncertainty of an entrepreneurial opportunity* (4), the higher this risk premium must be to induce the entrepreneur to choose entry over deference. Hence, the higher uncertainty, the less likely the person will enter entrepreneurship.

2.2.2 The characteristics of part-time entrepreneurship in the light a real options perspective

Whereas the entry choice was traditionally seen as a binary choice between full-time entrepreneurship and wage work, a third possible option in the real options considerations of entrepreneurs has recently received attention from entrepreneurship researchers: Part-time entrepreneurship. The phenomenon of part-time entry to entrepreneurship has been researched under different labels and definitions (for an overview see Landgraf, 2015). The two labels which have been used most commonly are 'part-time entrepreneur' and 'hybrid entrepreneur'. A part-time entrepreneur has been defined through her self-perception or hours worked, her main source of income or her main occupation. Hybrid entrepreneurs, instead, are defined as individuals "*who mix their time in both self-employment and wage work*" (Folta et al., 2010, p. 253). Hybrid entrepreneurs thus form a subcategory of part-time entrepreneurs. For the purpose of this study, I follow the definition that is closest to the literal meaning of the term part-time entrepreneur, which is a person devoting only a part of her regular working week of 35 hours to her venture.

Part-time entrepreneurs, in contrast to full-time entrepreneurs, can therefore combine their first steps into entrepreneurship with wage work. This arrangement allows part-time entrepreneurs to gather information on the quality of the entrepreneurial opportunity and maintaining the investment option, while also enjoying income from wage work. After the initial entry, a part-time entrepreneur is faced with subsequent investment decisions in which she has the option to exit entrepreneurship, maintain the level of investment or intensify the investment by transitioning to full-time entrepreneurship. Exactly because part-time entry allows entrepreneurs such a staged entrance into entrepreneurship, thus a staged investment decision, it is ideally researched within the real options framework (Raffiee and Feng, 2014; Wennberg et al., 2006).

Importantly, part-time entry to entrepreneurship does not simply equal full-time entrepreneurship with a lower time investment. The existing research has shown that part-time entrepreneurs differ from full-time entrepreneurs in their motives and micro-level determinants (Block and Landgraf, 2016; Folta et al., 2010; Raffiee and Feng, 2014). Folta et al. (2010) describe three motives unique to part-time entrepreneurship: supplementary income, nonmonetary benefits and part-time entrepreneurship as a stepping stone to full-time entrepreneurship. Raffiee and Feng (2014) compare part-time and full-time entrepreneurs and find that with regard to their risk preferences, part-time entrepreneurs rather resemble employed wage workers than full-time entrepreneurs.

In addition, studies have demonstrated that the distinct characteristics of part-time entrepreneurship affect the four parameters that influence entry considerations, thus making part-time entry a distinct option in the decision between entry and deference (Raffiee and Feng, 2014). In the following, I draw on the existing part-time entrepreneurship literature to illustrate how the distinct characteristics of part-time entrepreneurship influence each of the four factors that determine the initial real option entry choice, as well as that at subsequent decision points of a staged entry.

The *opportunity costs* (1) of an entrepreneur are defined as the income from other sources she foregoes, in order to pursue an entrepreneurial opportunity (Amit et al., 1995). Raffiee & Feng (2014) point out that part-time entry, in contrast to an entry on a full-time basis, affords the entrepreneur with the opportunity to continue earning income from wage work in parallel to creating a venture. This limits the opportunity costs an entrepreneur incurs when initially entering entrepreneurship. Furthermore, part-time entrepreneurship allows the entrepreneur to delay the decision to forego the entire income from wage work in favour of income from the entrepreneurial activities until a later point when the income potential of the entrepreneurial opportunity is more certain or realized. The part-time entrepreneur thus has the chance to lower her opportunity costs through a staged entry.

Entrepreneurs typically incur *switching costs* (2) when they enter entrepreneurship from wage work. Part-time entrepreneurship, however, in contrast to full-time entrepreneurship, allows an entrepreneur to retain the benefits connected to wage work, at least partially, while working on her venture. As a result, the switching costs are lower for part-time entrepreneurs than for full-time entrepreneurs (Folta et al., 2010).

Creating a venture in part-time typically requires a lower *resource commitment* (3) from the entrepreneur than the creation of a venture to which the entrepreneur is committed in full-time (Block and Landgraf, 2016; Metzger, 2014; Wennberg et al., 2006). While this does not influence the irreversibility of the investments, it lowers the overall downside risk for part-time entrepreneurs in the case of failure.

Finally, part-time entrepreneurs, inadvertently or on purpose, will learn more about their entrepreneurial abilities and the value of the entrepreneurial opportunity (Folta et al., 2010; Raffiee and Feng, 2014; Wennberg et al., 2006). As a result, part-time entrepreneurship is an efficient way to reduce the *uncertainty inherent to each entrepreneurial opportunity* (4), and thus the risk, involved in entrepreneurial entry.

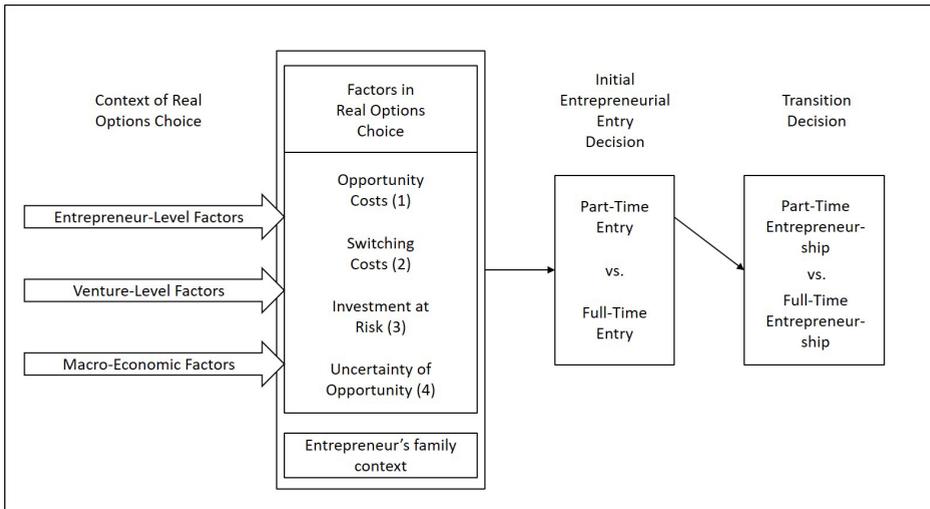


Figure 2.1 Context and Factors in the Real Options Entry Decision

After establishing through which mechanisms, the four factors influence an entrepreneur's choice between a part-time and full-time entry, I am now able to analyse systematically how the context of the real option choice shapes the factors and in turn the choice of the entrepreneur (Figure 2.1). In the following section I review what we know about how institutional, venture-level and entrepreneur-level factors influence switching and opportunity costs, as well as investment costs and uncertainty. Based on this review, I derive hypotheses under which circumstances a part-time entry to entrepreneurship becomes more or less likely. Similarly, I hypothesize how the context influences the subsequent transition choice of entrepreneurs who initially opted for a part-time entry. I formulate hypotheses how institutional, venture-level and entrepreneur-level factors, through the four factors identified above, inform the likelihood and timing of a part-time entrepreneur committing herself full-time to the venture. In addition, I recognize that the family context of an entrepreneur influences her willingness to engage in uncertain entrepreneurial activities and thus her choice between an entry to entrepreneurship in part-time or full-time.

2.2.3 Entrepreneur-level factors and part-time entrepreneurship

Amongst the three contextual levels, the characteristics of the entrepreneur herself have been studied most extensively in their effects on part-time entrepreneurial entry (compare the Appendix). All existing studies focus on entrepreneur-level determinants as the main independent variables or at least control for multiple of these determinants. Often, these determinants are explicitly or implicitly described in their effect on the risk profile of an entrepreneur or on her opportunity and switching costs. For example, gender (Hillmann, 2016), family situation (marital status, financially dependent family members) (Schulz et al.,

2016) and obviously risk aversion (Raffiee and Feng, 2014) are linked to the amount of risk an entrepreneur is willing to take, which in turn influences her choice between part-time and full-time entry.

I follow Raffiee and Feng (2014) and Schulz et al. (2016) in assuming that those with family obligations in the form of a marriage or a financially dependent child will seek to reduce the risk associated with an entrepreneurial entry. From this follows, that those with family obligations opt more often for a part-time rather than a full-time entry to entrepreneurship.

H1a: *Married entrepreneurs are less likely than unmarried entrepreneurs to enter entrepreneurship in full-time.*

H1b: *Married entrepreneurs are less likely than unmarried entrepreneurs to transition to full-time entrepreneurship.*

H2a: *Entrepreneurs with at least one financially dependent child are less likely than entrepreneurs without children to enter entrepreneurship in full-time.*

H2b: *Entrepreneurs with at least one financially dependent child are less likely than entrepreneurs without children to transition to full-time entrepreneurship.*

Rather surprisingly, only one paper so far has addressed the difference between opportunity-driven versus necessity-driven entrepreneurship in the context of part-time entrepreneurial entry (Block and Landgraf, 2016). The type of entrepreneurship has been shown to fundamentally influence the behaviour of entrepreneurs (Block et al., 2015; Block and Wagner, 2010). The most recent Global Entrepreneurship Monitor (2018) points out that roughly a quarter of all entrepreneurs are entering entrepreneurship out of necessity because they lack better employment options. Through the lens of the real options logic, the lack of attractive alternatives means that necessity-driven entrepreneurs have much lower *opportunity costs* (1) than those that are motivated by a clear entrepreneurial opportunity. The real options logic, then, stipulates that lower opportunity costs mean a larger propensity to enter in full time. My hypothesis concerning the motive to enter entrepreneurship is thus:

H3a: *Opportunity-driven entrepreneurs are less likely than necessity-driven entrepreneurs to enter entrepreneurship in full-time.*

Similarly, necessity-driven entrepreneurs hesitate less than opportunity-driven entrepreneurs who have better employment alternatives to invest more time into their ventures.

H3b: *Opportunity-driven entrepreneurs are less likely than necessity-driven entrepreneurs to transition to full-time entrepreneurship.*

With regard to *switching costs* (2), Folta et al. (2010) emphasize that these costs increase, the more employer-specific benefits an entrepreneur receives. These authors use an entrepreneur's industry and employer tenure, as well as her employer's size and age, as indicators for switching costs. In this light, I put forward that the most recent employment arrangement, before starting a new venture will impact the likelihood of an entrepreneur to enter in part-time or full-time. An entrepreneur who is employed at the moment of entry will incur switching costs an already self-employed entrepreneur will not face. My hypotheses therefore are:

H4a: *Already self-employed entrepreneurs are more likely than employed entrepreneurs to create the new venture in full-time.*

The entrepreneur's previous self-employment experience, and the self-employment experience of her parents, improve the understanding and ability to mitigate the *uncertainty* (4) involved in entrepreneurial entry (Folta et al., 2010; Raffiee and Feng, 2014). The assumed ability of experienced entrepreneurs to mitigate the uncertainty associated with an entrepreneurial entry suggests, that they depend less on a part-time entry to reduce these risks. Therefore, I propose:

H5a: *Entrepreneurs with previous self-employment experience are more likely than first-time entrepreneurs to create the new venture in full-time.*

H5b: *Entrepreneurs with previous self-employment experience are more likely than first-time entrepreneurs to transition to full-time entrepreneurship.*

2.2.4 Venture-level factors and part-time entrepreneurship

The venture's industry is the most intensely studied aspect of a venture in relationship to part-time entry. Nonetheless, only one study focuses on the venture's industry as a driver of part-time versus full-time entry (Wennberg et al., 2006). In addition, a couple of studies control for industry membership of ventures when studying the entry mode of entrepreneurs (Bögenhold and Klinglmair, 2016; Petrova, 2012; Raffiee and Feng, 2014). Wennberg et al. (2006) find that industry uncertainty, measured by the variation in industry-level investments, has a negative effect on both forms on entrepreneurial entry. And, indeed, in line with the expectations of the real options theory, full-time entry is more strongly negatively affected by industry uncertainty than part-time entry. In addition, the results support the authors' hypothesis that the likelihood of part-time entrepreneurs switching to a full-time commitment is reduced by industry uncertainty.

To the best of my knowledge, no study exists that explicitly investigates the effect of other venture-level differences on the entry mode of a venture's entrepreneur. Two studies merely control for a specific venture characteristic: Raffiee & Feng (2014) control for a venture's size in terms of employees, whereas Thorgren et al. (2016) test whether an entrepreneur was a member of an entrepreneurial team or not. Neither of these factors is found to play a significant role in the choice between an entry in part-time or full-time.

Because venture-level factors are all but absent from the literature on part-time entry, Raffiee & Feng (2014) call for studies that research the influence of these factors on the entry choices of entrepreneurs. While no study has explicitly studied whether the nature of a good produced by a venture influences an entrepreneur's preference of entering on part-time or full-time basis, previous work sheds light on the differences between manufacturing and service-oriented industries. Petrova (2012) finds, that the rate of part-time entrepreneurship is higher in service heavy industries than in manufacturing heavy ones. I contend that measuring the nature of a business on an industry level is an unnecessarily coarse measure and instead propose to use the type of good (service or product), as the basis for this variable (compare (Archibugi, 2001)).

The difference between service and product offerings (Nijssen et al., 2006) in the scale of investment, as well as differences in R&D intensity play a central role in the context of entry. The *increased investment requirements* (3) and technological complexity of developing a product rather a service (Alic, 2001; Brouwer and Kleinknecht, 1996; Nijssen et al., 2006) mean that entrepreneurs who develop a product face larger risks. The increased risks should induce this group of entrepreneurs to lower the risk through a part-time entry. However, in some cases, producing a product only makes economic sense when it is produced on a larger scale, which in turn might prohibit an entrepreneur to create such a product-based venture on a part-time basis (Petrova, 2011; Raffiee and Feng, 2014). In the light of these two contradicting effects, I argue that the scale argument only applies to a select group of ventures, whereas the larger risks due to complexity and technology orientation structurally apply to all product ventures. Therefore, I put the following hypotheses forward:

H6a: *Entrepreneurs planning to create a venture that develops a product rather than a service are more likely than other entrepreneurs to enter entrepreneurship in part-time.*

The real options theory suggests that, when part-time entrepreneurs face larger risks and higher uncertainty, they postpone increasing time and monetary investments to a point in time when they have learned more about their own entrepreneurial qualities and about those of the entrepreneurial opportunity. Therefore, I contend:

H6b: *Entrepreneurs creating a venture that develops a product rather than as service on a part-time basis will switch to a full-time commitment later in the venture creation process, if they do so at all.*

Raffie & Feng (2014) mention the degree of novelty of a venture as a potentially important venture-level determinant. While the effect of innovativeness on venture survival remains debated (Hyytinen et al., 2015), there is no doubt that creating an innovative venture is inherently more *uncertain* (4) and complex than the creation of an imitative venture (Samuelsson and Davidsson, 2009). In view of the real options theory entrepreneurs faced with higher uncertainty should be more induced to enter in part-time to counter the increased uncertainty. My hypothesis holds:

H7a: *Entrepreneurs planning to create a radically or incrementally innovative venture are more likely than other entrepreneurs to enter entrepreneurship in part-time.*

In situations of high uncertainty, part-time entrepreneurs find it beneficial to postpone increasing their time commitment. This allows them to reduce uncertainty through additional experience and information, I thus put forward:

H7b: *Entrepreneurs creating a radically or incrementally innovative venture on a part-time basis will switch to a full-time commitment later in the venture creation process, if they do so at all.*

2.2.5 Institutional framework and part-time entrepreneurship

Hall and Soskice (2001) argue in their seminal work on the 'Varieties of Capitalism' that differences in the institutional framework of economies induce companies to solve the coordination problems they face in different ways across these economies. Every institutional framework provides different degrees of support for different coordination mechanisms, such as competition or collaboration. In turn, this induces companies to gravitate towards the coordination mechanism receiving the strongest support in their respective economy. As a result companies employ certain competitive strategies more often in some economies than in others (Herrmann, 2008).

Dili et al. (2018) show that different institutional settings not only affect established companies, but also create different types of entrepreneurship (see also Herrmann, 2019). The institutional arrangement of countries significantly impacts occupational choices, amongst which the choice of entry or deference (Baumol, 1996; Busenitz et al., 2000; North, 1990). However, only two studies have researched the effects of institutions on the entry decision part-time versus full-time entrepreneurship. Of these studies only one is a multi-country study.

On the basis of a multi-country dataset Block et al. (2018b) study how the preferences for entering entrepreneurship on a part-time and full-time basis are differently affected by informal institutions such as uncertainty avoidance, performance orientation, institutional collectivism, future orientation, and gender egalitarianism. They find that uncertainty avoidance and institutional collectivism have a stronger negative influence on full-time entrepreneurship than on part-time entrepreneurship. In addition, Block et al. (2018b) show that the positive influence of future orientation on entrepreneurship is stronger for full-time than for part-time entry.

The effect of formal institutions on part-time and full-time entrepreneurship, so far, has been studied in a single study. In the Mexican context Schulz et al. (2016) find that changes in regulations can have different effects on part-time and full-time entrepreneurs. In their study, they find that simplified entry regulations to entrepreneurship stimulated part-time entry significantly stronger than full-time entry. These findings underline that part-time and full-time entrepreneurship are two different kinds of entrepreneurship and need to be treated separately, to understand the effects of institutional differences on entrepreneurship better.

The VoC literature clusters countries according to the institutional setting they have created. Initially, the VoC literature identified two such distinct institutional settings, namely Liberal Market Economies (LMEs) and Coordinated Market Economies (CMEs), represented exemplarily by the US and the UK, respectively Germany. Whereas the low regulation institutional settings of LMEs induce companies to behave competitively, the more heavily regulated ones of CMEs elicit coordinated, non-market based company interaction (Hall and Soskice, 2001). Since the publication of the seminal work by Hall & Soskice, other varieties of capitalism have been identified amongst which Mixed Market Economies (MMEs), such as Italy and Spain, are prominent examples. MMEs combine elements of both LMEs and CMEs, for example by combining liberal labour protections regulations with an extensive social security system (Molina and Rhodes, 2007).

Regarding the institutions that influence an individual's entry choice most directly, stark contrasts between institutional settings in LMEs and CMEs are evident. These labour market institutions include labour protection laws, the social security system and industrial relation (Dilli et al., 2018; Elert et al., 2017).

Stricter labour protection laws in CMEs afford employees, compared to the situation in LME and MMEs, with stronger protection against being fired by their employer. Through the lens of the real options theory the increased job security in CMEs makes wage work more attractive vis-à-vis entrepreneurship. In other words, strict labour protection increases an entrepreneur's *opportunity costs* (1) and thus deter her from full-time entry (Elert et al., 2017; Hessels et al., 2006; Ho and Wong, 2007; van Stel et al., 2007; Wennekers et al., 2005). Because part-time

entrepreneurship allows entrepreneurs to explore an entrepreneurial opportunity without necessarily having to give up wage work, and the security that comes with it, I expect part-time entry to be less negatively affected by stricter labour protection laws than full-time entry. As a result, entrepreneurs in CMEs should be more induced to choose for a part-time entry than their counterparts in LMEs and MMEs.

In CMEs, compared to LMEs and MMEs, industrial relations depend more on reciprocal cooperation and coordination and less on arm-length, market-based contracts. As a result, employees in CMEs are inclined to make employer-specific investments in return for longer term employment contracts and a stronger say in the strategic decision-making process of the employer. Conversely, the fluid labour markets in LMEs and MMEs, incentivize companies to pursue short term opportunities with a flexible work force. From this follows, that employees are less motivated to make employer-specific investments in LMEs and MMEs than in CMEs (Hall and Soskice, 2001). From a real options perspective, employer-specific investments increase an entrepreneur's *switching costs* (2) when she switches from wage work to entrepreneurship (Folta et al., 2010). As outlined by the same authors (Folta et al., 2010), part-time entry to entrepreneurship is an effective way to reduce or delay incurring switching costs. Consequently, I expect entrepreneurs in CMEs, to be more inclined than their counterparts in LMEs and MMEs to enter entrepreneurship in part-time rather than part-time.

Finally, in CMEs, and to a lesser extent in MMEs, employees benefit from more extensive welfare state than in market-oriented LMEs. The welfare state, amongst other things, provides higher unemployment benefits to those unable to find an occupation. Higher unemployment benefits are known to negatively affect the likelihood to enter entrepreneurship out of unemployment (Carrasco, 1999; Koellinger and Minniti, 2009). Higher unemployment payments discourage entry to entrepreneurship out of unemployment, simply because the reservation wage, the opportunity costs, are too high (Henrekson et al., 2010). Real options logic suggests, given that unemployment benefits must be forfeited regardless of whether an entry to entrepreneurship happens in part-time or full-time, an entrepreneur would, *ceteris paribus*, opt to enter in full-time. The real options logic, then, predicts this outcome because there is no additional downside in the additional time investment while the upside of the investment increases. However, Koellinger and Minniti (2009) show that entrepreneurial entry is negatively affected by unemployment benefits, regardless of type of entrepreneurship or motivation to enter. Thus, I conclude that higher unemployment benefits found in CMEs will not significantly influence an individual's choice between part-time or full-time entry to entrepreneurship.

In summary of the arguments brought forward with regard of the effect of institutional settings on the entry choice of entrepreneurs, I thus put forward:

H8a: *Entrepreneurs in CMEs are more likely than those in LMEs or MMEs to enter entrepreneurship in part-time rather than full-time.*

Building on the argument proposed above, I contend that in CMEs, the labour protection law and industrial relations induced *opportunity* (1) and *switching costs* (2) make it less appealing for part-time entrepreneurs to increase their time commitment. The additional opportunity and switching costs mean that the entrepreneurial opportunity has to be more attractive and certain than it would have to be in LMEs or MMEs, to induce a part-time entrepreneur to switch to a full-time commitment. Therefore, I propose:

H8b: *Part-time entrepreneurs in CMEs are less likely to switch from part-time to full-time and will do so later than those in LMEs or MMEs.*

2.2.6 The entry choices of joining entrepreneurs

It is now widely acknowledged that entrepreneurship and the creation of ventures are often carried out in teams of entrepreneurs rather than by single entrepreneurs. However, only a limited number of studies has analysed how the composition of entrepreneurial teams changes over time. Amongst those exceptions is the study by Ucbasaran et al. (2003) who analyse the factors driving exits and entries from and to the entrepreneurial team. In addition, the study by Held et al. (2018) explores which sequences in team formation of nascent ventures exists. Neither of these studies explores whether differences in the entry choices exist between the original members of the entrepreneurial team and those who join the team later. One study that does control for point of entry, finds significant differences between original entrepreneurs and key employees that join after the original entrepreneurs (Roach and Sauermann, 2015). The authors do not distinguish between founders who join the venture at different points in time.

The fact that joining entrepreneurs, by definition, enter the venture at a later stage than the original entrepreneurs means that additional information about the value of the entrepreneurial opportunity has been amassed, by the time they consider joining the venture. The value of the entrepreneurial opportunity, therefore, will be more clearly defined at the moment of entry for the joining entrepreneurs. This reduction in uncertainty means that the real options choice between part-time or full-time entry a joining entrepreneur faces differs from that of an original entrepreneur. While all the above described mechanisms will influence the decision-making process of joining entrepreneurs, I contend that the additional information at the joining entrepreneur's disposal will moderate the influence of these factors. The reduced uncertainty about the opportunity's value will lower, *ceteris paribus*, the tendency of a joining entrepreneur to enter in part-time rather than full-time.

H9: *The directionality of the factors inducing original entrepreneurs to prefer a part-time over a full-time entry will be same in case of joining entrepreneurs. However, the effects will be weaker.*

2.3 METHODS

2.3.1 Data

I draw on data from a unique venture-level dataset entitled “Perfect Timing Database”. We carried out interviews with entrepreneurs in two waves between 2011 and 2018 based on computer-assisted telephone interviews with an international research team located in Utrecht (The Netherlands), New York (US), Germany (Düsseldorf and Cologne), London (UK), and Palermo (Italy). To capture possible variations in venture creation processes, the population interviewed includes ventures of all legal forms (excluding sole proprietorship) that were registered between 2004 and 2014 in the information technology (IT) and renewable energy (RE) industries in Germany, Italy, the United States (US), The Netherlands and the United Kingdom (UK). From this population, entrepreneurs were randomly selected and invited to participate in an interview about the venture creation process of their venture until a representative sample of 841 ventures had been obtained. Out of this dataset, I have sufficient data at the level of the individual entrepreneur for 570 ventures which form the basis for the analysis presented in this study. As this level of data was not recorded for any ventures in The Netherlands, the used dataset consists of ventures from Germany, Italy, the UK and the US.

Table 2.1 Number of Ventures, Entrepreneurs and Average Team Size

	Entrepreneurial Team Size					Total
	1	2	3	4	5	
Ventures (N)	177	220	98	40	35	570
Entrepreneurs (N)¹	177	427	270	149	159	1,182
Average Team Size (N)						2.19

For each of these ventures we recorded the time commitment of each entrepreneur on a monthly basis over the initial phase of the venture creation phase. As a result, I have a dataset consisting of the time commitment of 1,182 individual entrepreneurs from the moment they entered the venture until the end of the venture creation (Table 2.1). The end of venture creation is defined as the venture reaching sustained profitability or being acquired, merged or closed down. In case none of these events had occurred at the date of the interview, a venture is classified as ‘ongoing venture creation’ and recorded for a maximum of 84 months. It is important to notice that a maximum of five entrepreneurs per venture was recorded in order to keep interview duration manageable.

1 In 68 cases we did not receive founder level demographics for each founder in the venture. Therefore, a divergence occurs in some team size categories between the number of ventures and the number of founders in that category.

In order to assess whether entrepreneurs who are part of the original entrepreneurial team differ in their entry decisions from those entrepreneurs who join a venture that is already in creation, I distinguish between entrepreneurs who were amongst those who began their activities within first three months of venture creation and those who joined later. Table 2.2 shows that 87.3% of the sample fall into the former category of original entrepreneurs.

Table 2.2 Number and Percentage of Original and Joining Entrepreneurs

Type of Entrepreneur	Total (N)	Total (in %)
Original Entrepreneur	1032	87.3
Joining Entrepreneur	150	12.7
Total	1182	100

2.3.2 Measures

Dependent Variables: For each of the two steps of my analysis I use a different dependent variable. For the first analysis step, I measure each entrepreneur's initial time commitment as a dichotomous variable. That is, I measure whether in the first month of working on her venture an entrepreneur invested more than 35 hours per week, defined as full-time (0), or less than 35 hours per week into the venture, defined as part-time (1). While different definitions and measurements exist of part-time and full-time entrepreneurship, this particular measure has the advantage of being objectively measurable. In contrast to income-based definitions, a time-based definition of part-time entrepreneurship does not suffer from underestimated income from entrepreneurship or a mismatch between income and perceived main occupation (Åstebro and Chen, 2014; Landgraf, 2015; Metzger, 2014).

In the second step of the analysis, I register whether an entrepreneur that entered entrepreneurship on a part-time basis ever increased her time-commitment to a full-time commitment (1) or not (0). If the entrepreneur did so, I additionally record how many months after the start of her entrepreneurial activity this transition occurred.

Independent Variables: The independent variables used to predict entry behaviour of entrepreneurs are operationalized as follows:

I use marital status and presence of a financially dependent child as proxies for risk acceptance of an entrepreneur. Both, marital status (1 = Married, 0 = Not Married) and the presence of at least one financially dependent child (1 = yes, 0 = no) are operationalized as a dichotomous variable. The ability to manage or mitigate the risks inherent to entering entrepreneurship is measured through the previous self-employment experience of an entrepreneur. Just like the variables on risk acceptance, this variable is operationalized

as a self-reported, dichotomous variable with the values no previous self-employment experience (0) and previous self-employment experiences (1).

In order to estimate the switching costs of an entrepreneur, I measure the occupation she held most recently before working on the venture. The most recent occupation an entrepreneur held, or still holds, when she enters entrepreneurship is self-reported and operationalized as employed (0), self-employed (1) or other (2).

I estimate the opportunity costs of an entrepreneur with the help of the motive the entrepreneur has to enter entrepreneurship. I distinguish between at least partially necessity-driven entry (0) and purely opportunity-driven entry (1). This is a self-reported variable.

All of the above variables measure the situation at the moment of entry to entrepreneurship, in other words the first month the entrepreneur started working on her venture.

The influence of venture characteristics is tested with the help of two independent variables. They are operationalized as follows: The innovativeness of a venture's business idea was determined in a three-step process. In the first step, the entrepreneur was asked whether her venture develops a radically new, incrementally new, or imitative product or service. In a second step, the interviewer (upon completion of the interview) cross-checked the entrepreneur's answer by comparing the venture's innovativeness with the innovativeness of the other ventures about which s/he had conducted interviews. In a third step, the person cleaning the data, again, cross-checked the degree of innovativeness indicated against the classification scheme he had developed while cleaning the data. In both step two and step three, the interviewer and the data cleaner relied on the information provided by the entrepreneur, as well as on online information about the venture's business idea. This three-step process made it possible to minimize the over-estimation bias that typically occurs when entrepreneurs self-report the level of their business' innovativeness. The degree of innovativeness was measured as imitation (0), improvement (1), or radical innovation (2).

I operationalize the type of good a venture aims to produce as either only services (0) or products, possibly in combination with services (1). This variable was recorded in the same three-step process as the venture's innovativeness.

The third level I consider in the analysis is the institutional framework of the country a venture was created in. The literature on VoC assumes that countries have different types of market economies which in turn are shaping the behaviours of actors within the economy through a distinct set of institutions (Hall and Soskice, 2001). In addition to LMEs and CMEs, another distinct set of institutions has been prominently featured in the VoC literature, labelled as

Mixed Market Economics (MMEs) (Molina and Rhodes, 2007). For each of these three sets of institutions, I use the prime examples used in the literature for this study: I classify the UK and the US as LMEs, Germany as a CME and Italy as a MME (Hall and Soskice, 2001; Molina and Rhodes, 2007).

Controls: I control for several venture characteristics to ensure that venture-specific characteristics beyond type of good and innovativeness do not influence the results. Firstly, I control for industry membership. The dataset contains ventures from two industries: Renewable Energies and ICT. Similarly, I check whether a venture was created as a “de novo” venture or is a spin-off/continuation of an already existing venture. With regard to the influence of the behaviour of co-entrepreneurs, I control for the number of part-time and full-time entrepreneurs that were already working on the venture when the focal entrepreneur begins working on the venture.

2.3.3 Estimation

The first part of the analysis tests the hypotheses concerning the influence that type of good, degree of innovativeness and the institutional setting have on the initial entry choice of entrepreneurs. Because the outcome variable is a binary one, I fit a logistics regression model to obtain the estimates. I use the R package ‘glm’ to fit the following model:

$$\ln\left(\frac{p_i}{1-p_i}\right) = \beta_0 + \beta_1 \text{MaritalStatus} + \beta_2 \text{Child} \\ + \beta_3 \text{Opportunity} + \beta_4 \text{PriorOccupation}_{\text{Other}} \\ + \beta_5 \text{PriorOccupation}_{\text{SelfEmployed}} + \beta_6 \text{SelfEmploymentExp.} + \beta_7 \text{TypeGood}_i \\ + \beta_8 \text{Innovativeness}_{\text{Incremental}} + \beta_7 \text{Innovativeness}_{\text{Radical}} \\ + \beta_9 \text{Institutions}_{\text{LME}} + \beta_{10} \text{Institutions}_{\text{MME}} + \beta' \mathbf{x}_i$$

where p_i denotes the probability that entrepreneur i chooses part-time rather than full-time entry, β_0 the intercept, $\beta_1 \dots \beta_{10}$ the estimated coefficients for our independent variables, β a vector of coefficients for the control variables, and \mathbf{x}_i a vector of control variables. I report the average marginal effects for this model in order to be able to interpret the effect size of each independent variable. I use the adjusted generalized variance-inflation factors (GVIF^{1/2(df)}) introduced by Fox and Monette (1992) to check for multicollinearity. All variables exhibit a value lower than 2, indicating that multicollinearity is not a problem.

In the second part of the analysis I explore the likelihood of a part-time entrepreneur to subsequently transition to full-time entrepreneurship. Following comparable research (Raffiee and Feng, 2014) I use a Cox Proportional Hazards model to estimate the likelihood (*the hazard*) that a part-time entrepreneur increases her time commitment at any moment of the venture creation process. The Cox Proportional Hazards Model enables me to analysis the

effect of multiple variables upon the time it takes until a specified event takes places. The Cox Proportional Hazards model allows for censored observation. Therefore, I register for every part-time entrepreneur whether she transitions to full-time (1) or not (0) and in which month of the venture creation the transition happened. In case no transition is observed by the time the observation stops, I record the length of the observation period.

I fit the same independent variables to this survival analysis as to the logistics regression model introduced above, with the exception of the variable registering the prior occupation. This variable causes a separation problem in the model, as no case with the value 'Other' transitions to full-time entrepreneurship. I report the exponentiated coefficients, called hazard ratio, rather than the coefficients for each independent variable because the hazard ratio expresses percentage change in the hazard for each unit change in the independent variable and thus allows for meaningful interpretation of the results.

2.4 RESULTS

2.4.1 The initial choice between part-time and full-time entry to entrepreneurship

The first part of my analysis explores whether original and joining entrepreneurs differ in their entry behaviour to entrepreneurship. Table 2.3 shows that only a small part of entrepreneurs joins a venture that is already in the process of being created. This group of entrepreneurs enters entrepreneurship more often in full-time (36.7%) than those who are in the group of original entrepreneurs (25.5%). Pearson's Chi-Square test of independence confirms that this difference is significant (Table 2.4). Original entrepreneurs are more likely to enter entrepreneurship in part-time than joining entrepreneurs.

Table 2.3 Distribution of Part-time and Full-Time entries

Type of Entrepreneur	Part-Time Entry (N)	Part-Time Entry (in %)	Full-Time Entry (N)	Full-Time Entry (in %)	Total (N)	Total (in %)
Original Entrepreneur	769	74.5	263	25.5	1032	87.3
Joining Entrepreneur	95	63.3	55	36.7	150	12.7
Total	864	73.1	318	26.9	1182	

Table 2.4: Chi Square test of independence - Initial Entry Decision

χ^2	df	p-value
7.7683	1	.005317***

p-values *** < .01, ** < .05, * < .1

Based on this difference, I analyse these two subgroups of entrepreneurs separately in the following analyses in order to be able to provide a more fine-grained picture of the entry behaviour of entrepreneurs. Next, I analyse to what extent institutional and venture-level factors influence the choice between initial entry to entrepreneurship in part-time or full-time for both, original and joining entrepreneurs.

Table 2.5 lists the distribution of part-time entries over the values for each of the independent variable used in the subsequent analysis. I find that almost three out of four entrepreneurs in our sample enter entrepreneurship in part-time (73.1%), further evidence how relevant part-time entrepreneurship is in the creation of ventures. This distribution reveals some differences in the likelihood of part-time entry between the institutional settings, the type of ventures and entrepreneurs. Especially low shares of entrepreneurs enter in part-time in LMEs (66.4%) and amongst those who are not married (70.7%) or do not have at least one child (70.3%). Conversely, a larger share of entrepreneurs from CMEs enters in part-time (79.2%), as do those who enter entrepreneurship because they have identified an entrepreneurial opportunity (75.6%).

Table 2.5 Descriptives Initial Entry Decision

Variable	Value	Part-Time Entry (N)	Full-Time Entry (N)	Total (N)	Part-Time Entry (in %)
Marital Status	Not Married	306	127	433	70.7
	Married	558	191	749	74.5
Children	No Children	405	171	576	70.3
	Child(ren)	459	147	606	75.7
Motivation	Necessity	292	133	425	68.7
	Opportunity	572	185	757	75.6
Prior Occupation	Employed	506	193	699	72.4
	Self-employed	285	93	378	75.4
	Other	73	32	105	69.5
Self-employment Experience	No experience	499	187	686	72.7
	Experienced	365	131	496	73.6
Type of Good	Service	223	82	305	73.1
	Product/Mix	641	236	877	73.1
Product Novelty	Imitative	409	143	552	74.1
	Incremental	350	133	483	72.5
	Radical	105	42	147	71.4
Variety of Capitalism	LMEs	299	151	450	66.4
	MMEs	245	83	328	74.7
	CMEs	320	84	404	79.2
Total		864	318	1,182	73.1

With the help of a logistic regression model (Table 2.6), I analyse which factors play a significant role in this real options choice and test hypotheses 1a-8a. For this purpose, I rely on the average marginal effect (AME). The AME expresses the likelihood that a change in the independent variable leads to a change in the dependent variable in percent. Values larger than zero accordingly express an increase in the likelihood of an entrepreneur to enter in part-time when the value of the respective independent variable increases.

I observe that neither of the variables used as indicators for the family context of the entrepreneur, financially dependent children and marital status, significantly influence the likelihood of a part-time entry to entrepreneurship. As a result, I reject hypotheses 1a and 2a.

On the level of the entrepreneur's personal characteristics, I test for the influence of motivation, prior occupation and previous self-employment experience. Hypothesis 3a posits that necessity-driven entrepreneurship is an indicator for low *opportunity costs* and will therefore promote

full-time entry. I find support for this hypothesis as opportunity-driven entrepreneurs, assumed to have higher opportunity costs, are especially likely to enter entrepreneurship in part-time. With regard to *switching costs* hypothesis 4a predicts that entrepreneurs who are already self-employed when they begin creating the focal venture will face lower switching costs and thus have a lower barrier to immediately work on the venture in full-time. The results support this hypothesis, as dependently employed entrepreneurs are more likely than self-employed ones to enter in part-time. In the last hypothesis concerning the entrepreneur's characteristics, I formulated the expectation that entrepreneurs with previous self-employment experience will be able to mitigate the *uncertainty of an entrepreneurial opportunity* better than those without such experience. As a result, I expect those with self-employment experience to be more inclined to take the higher risks associated with a full-time entry. The results suggest no such relationship, which means hypothesis 5a is rejected. I conclude that, while no effect of the family context was found on of the entrepreneur's entry decision, the entrepreneur's characteristics, namely motivation and prior occupation, play a significant role in this decision.

The next set of hypotheses aims to shed light on the influence of venture-specific characteristics on the entry decision of entrepreneurs. In these hypotheses, I test, whether the type and novelty of product developed by an entrepreneur's venture inform her entry choice. In hypothesis 6a I contend that the *higher investments* required to develop a product rather than a service will induce entrepreneurs to enter in part-time rather than full-time. However, I find no support for this hypothesis in the results. Similarly, I find no support for hypothesis 7a which predicts that the increased complexity and uncertainty of developing a novel, rather than imitative product, increases the likelihood of a part-time entry to entrepreneurship. Overall, I find that neither of the tested venture characteristics influences the entry choice of entrepreneurs significantly. Finally, I test the influence of the institutional setting on the entry choice of entrepreneurs. Hypothesis 8a states that entrepreneurs in CMEs have higher *opportunity and switching costs* when choosing for entrepreneurship than those in MMEs and LMEs. As a consequence, these entrepreneurs should be more likely to enter entrepreneurship in part-time. Contrary to these expectations, I observe that original entrepreneurs choose their entry mode independent of the institutional framework they are working under. As a result, hypothesis 8a is rejected.

However, I find a significant correlation between the characteristics of the entrepreneurial team and the entry choice of the focal entrepreneur. I observe that the number of entrepreneurs already actively working on the creation of the venture or entering at the same moment as the focal entrepreneur, either in part-time or full-time, strongly influence the entry decision of the focal entrepreneurs. The more part-time entrepreneurs work on the venture, the more likely the focal entrepreneur will also choose this entry option. The reversed relationship exists between the number of active full-time entrepreneurs and the likelihood of the focal entrepreneur to enter in part-time. Furthermore, the industry is a factor in the decision-making process of entrepreneurs.

Table 2.6 also reveals clear differences between the results of the group of joining entrepreneurs and those of the original entrepreneurs. In hypothesis 9a I formulated the expectation that the effects would be weaker (but with the same directionality). I observe that some factors are significant for both groups of entrepreneurs, namely opportunity entrepreneurship, the number of part-time and full-time entrepreneurs, as well as the industry. However, I do not observe that the effect size is significantly smaller for joining entrepreneurs. The only significant differences exist for previous self-employment and operating in a LME. In neither case is the effect of the same directionality and weaker for joining entrepreneurs. On this ground I reject H9.

Table 2.6 Regression Table - Initial Entry Decision

	Original Entrepreneurs (1)		Joining Entrepreneurs (2)		Difference (1) and (2)
	AME	SE	AME	SE	
Married	.0009	.0297	.0856	.0979	
Child(ren)	.0168	.0283	-.0033	.0919	
Opportunity Entrepreneurship	.0795	.0242***	.1420	.0816*	
Occupation - Other	-.0247	.0439	-.1019	.1675	
Occupation - Self-employment	-.0672	.0291**	.1502	.0946	**
Self-employment Experience	-.0055	.0252	.0925	.0884	
Type of Good -Product/Mix	.0085	.0260	.0763	.0921	
Novelty - Incremental	-.0127	.0258	-.0561	.0790	
Novelty - Radical	-.0458	.0401	-.0301	.1141	
Institutions - LMEs	-.0288	.0286	-.2236	.0906**	*
Institutions - MMEs	-.0095	.0316	-.1248	.0929	
Nr. of PT Entrepreneurs	.1061	.0133***	.1417	.0689**	
Nr. of FT Entrepreneurs	-.1566	.0146***	-.1919	.0582***	
De Novo Venture	-.0387	.0357	.0590	.1046	
Industry - Renewables	.0548	.0258**	.1297	.0766*	
Observations	1,032		150		
Log Likelihood	-42.919		-74.484		
Akaike Inf. Crit.	873.839		18.967		

p-values *** < .01, ** < .05, * < .1

The results further reveal that the institutional setting has a significant influence on the choice between part-time and full-time entry for entrepreneurs who join the venture after some time has passed. The directionality of the relationship is in accordance with the expectations formulated in H8a for the original entrepreneurs: Joining entrepreneurs in LMEs are more likely than those in CMEs to immediately start working in full-time on their venture.

2.4.2 The transition from part-time-time to full-time entrepreneurship

The second part of the analysis focuses on the factors that drive the choice of part-time entrepreneurs to transition to full-time during the venture creation process. Table 2.7 shows the percentage of original and joining part-time entrepreneurs to transition to a full-time commitment. The difference in the proportion of transitioning entrepreneurs is rather large. The significance of this difference in transition behaviour is clearly confirmed in the Chi-Square test (Table 2.8). The results allow the conclusion that original part-time entrepreneurs are much more likely to transition to full-time entrepreneurship than joining part-time entrepreneurs.

Table 2.7 Distribution of Transition to Full-Time

Type of Entrepreneur	Part-Time Entry (N)	Transition to FT (N)	Transition to FT (%)
Original Entrepreneur	769	412	53.6
Joining Entrepreneur	90	14	15.6
Total	859	426	49.6

Table 2.8 Chi Square test of independence - Transition Decision

χ^2	df	p-value
45.082	1	.00000***

p-values *** < .01, ** < .05, * < .1

In the following part I explore the factors that affect the probability of part-time entrepreneurs to transition to full-time entrepreneurship. Table 2.9 records how likely part-time entrepreneurs were to transition to full-time across the variables used in the subsequent survival model. Furthermore, it records after how many months, on average, a part-time entrepreneur transitioned to full-time, if she did so. I find that roughly half of the part-time entrepreneurs (49.6%) in our sample transition to full-time entrepreneurship within the observed timeframe. Those who do so, transition on average a little less than 12 months after starting to work on the creation of the venture. Interestingly, I observe that not all variables associated with a higher likelihood to transition are also associated with an earlier transition. For example, entrepreneurs working on an incrementally novel product are especially likely to transition to full-time (54%) but do so later than their peers. Other groups that display a particularly high transition probability are necessity and unmarried entrepreneurs, as well as those working in LMEs. Those creating their venture in CMEs are both rather unlikely (40.3%) and later than others to transit.

In order to test hypotheses 1b through 8b, I run a Cox regression model to assess what factors influence the likelihood ('risk') of a part-time entrepreneur to increase her time commitment

from part-time to full-time. The following results (Table 2.10) are based on the exponential coefficients $\text{Exp}(B)$, thus the hazard ratio, which expresses higher chance of transitioning to full-time entrepreneurship through larger coefficients.

Table 2.9 Descriptives Transition Decision

Variable	Value	PT Entry (N)	Transition to FT (N)	Transition to FT (%)	Avg. Month of Transition
Marital Status	Not Married	306	183	59.8	11.68
	Married	558	243	43.5	12.05
Children	No Children	405	213	52.6	11.73
	Child(ren)	459	213	46.4	12.06
Motivation	Necessity	292	172	58.9	11.78
	Opportunity	572	254	44.4	11.96
Self-employment Experience	No experience	499	274	54.9	11.46
	Experienced	365	152	41.6	12.68
Type of Good	Service	223	113	50.7	11.51
	Product/Mix	641	313	48.8	12.03
Product Novelty	Imitative	409	193	47.2	9.91
	Incremental	350	189	54.0	14.09
	Radical	105	44	41.9	11.16
Variety of Capitalism	LMEs	299	169	56.5	12.07
	MMEs	245	128	52.2	9.32
	CMEs	320	129	40.3	14.21
Total		864	426	49.6	11.89

Again, I first examine the results concerning the personal context of the entrepreneur before focusing on the personal characteristics of the entrepreneur, the venture and lastly the institutional setting. Consistent with hypothesis H1b, the data shows a negative relation between being married and transitioning to full-time entrepreneurship. Surprisingly, having at least one child has the reversed directionality. This is contrary to the expectations formulated in H2b and requires further investigation. Hypothesis 2b is consequently rejected.

I now turn to the personal characteristics of the entrepreneur. In H3b, I describe how the higher *opportunity costs* that opportunity-driven entrepreneurs have, compared to those who enter entrepreneurship out of necessity, will make them more hesitant to transition to a full-time commitment. The empirical results support this hypothesis, as the likelihood of a transition decreases with a change from necessity to opportunity entrepreneurship. With regard to the role of self-employment experience in the transition choice H4b proposed that experienced

entrepreneurs are more capable of mitigating the *uncertainty* of entrepreneurship than their inexperienced counterparts and thus more willing to transition to full-time entrepreneurship. However, the results reveal that the opposite is true. In other words: Experienced entrepreneurs are less likely to transition to a full-time commitment, as a result I reject hypothesis 4b.

Table 2.10 Cox regression model - Transition Decision

	Original Entrepreneurs (1)		Joining Entrepreneurs (2)		Difference (1) and (2)
	Exp (B)	SE	Exp (B)	SE	
Married	.651	.127***	.410	.872	
Child	1.250	.125*	.483	.879	
Opportunity Entrepreneurship	.699	.102***	.084	.893***	***
Self-employment Experience	.754	.106***	.371	.695	
Type of Good -Product/Mix	1.086	.122	.130	.995**	**
Novelty - Incremental	1.294	.180	.309	1.012	
Novelty - Radical	1.722	.187***	.333	.857	**
Institutions - LMEs	1.474	.125***	5.098	.906*	
Institutions - MMEs	1.414	.132***	.719	1.117	
De Novo Venture	.921	.147	.328	.798	
Industry - Renewables	.426	.123***	.698	.798	
Observations	769		95		
R ²	.142		0.266		
Log Likelihood	.998		0.711		
Wald Test (df = 11)	-2,441.080		-44.206		
LR Test (df = 11)	109.870***		23.260**		
Score (Logrank) Test (df = 11)	117.431***		29.378***		

p-values *** < .01, ** < .05, * < .1

The venture level hypotheses 5b and 6b posit that the higher *investment that is at risk* when a venture develops a tangible product and the increased *uncertainty* of a novel product deter entrepreneurs to transition to full-time. However, I find support for neither hypothesis. The type of product a venture develops is not associated with the entrepreneur's transition decision at all, whereas the effect observed for radical novel products has the reversed directionality. In my sample, part-time entrepreneurs are thus especially likely to transition to full-time entrepreneurship if their venture develops a radically novel product.

I observe that the institutional setting in which a part-time entrepreneur creates a venture influences her second step time allocation choice significantly. I find that part-time

entrepreneurs in MMEs and LMEs are more likely than those in CMEs to transition to full-time entrepreneurship. In hypothesis 8b I put forward that the higher opportunity and switching costs part-time entrepreneurs face in CMEs will deter them from transitioning to a full-time commitment. The analysis shows that part-time entrepreneurs in CMEs exhibit the predicted transition behaviour, which is why hypotheses 8b is confirmed.

In terms of control variables, the industry also significantly influences the transition decision, whereas the type of venture, de novo or spin-off, does not inform this decision.

The comparison between the factors affecting the transition likelihood of original entrepreneurs and joining entrepreneurs reveals pronounced differences. None of the factors measuring the family context of the entrepreneur influence the transition decision of joining part-time entrepreneurs. The entry motivation has a strong effect on the transition decision of joining entrepreneurs. Those joining entrepreneurs who pursue an opportunity are less inclined to transition to full-time. This effect is also observed for original founders. However, the influence that previous self-employment has on original entrepreneurs is not replicated in the case of joining entrepreneurs. The characteristics of the venture influence the transition behaviour of joining part-time entrepreneurs in so far, as those entrepreneurs in product developing ventures are less likely to transition. This is in line I formulated in hypothesis 6b but found not support amongst the original entrepreneurs. Lastly, I observe that joining part-time entrepreneurs, just like original entrepreneurs, are more likely to transition, if they are active in a LME rather an CME. Taken together I find no evidence that the status of a joining entrepreneur systematically moderates the effect size of the considered independent variables, as result I find no support for H9.

2.5 DISCUSSION & LIMITATIONS

2.5.1 Discussion

As labour markets in Western economies become more flexible and fragmented, part-time entrepreneurship is gaining importance. Part-time entrepreneurship is a low barrier entry option to entrepreneurship that can be combined with wage work. Additionally, it can serve as a stepping stone towards full-time entrepreneurship. Part-time entrepreneurship represents a different form of entrepreneurship than traditional full-time entrepreneurship, with different drivers and outcomes.

Therefore, we need to distinguish between these forms of entrepreneurship to gain a more fine-grained understanding of entrepreneurship and its drivers. If we want to encourage one, rather than the other type of entrepreneurship, we need to know what the drivers in the choice between an entry to entrepreneurship on a part-time or full-time basis are. Of particular importance in this context is the effect of venture characteristics and national institutions on this choice and on the likelihood of part-time entrepreneurs to transition to a full-time commitment.

This paper takes a real options perspective on this choice in a first attempt to explore in how far it is affected by institutions. I partially confirm the importance of entrepreneur-level characteristics and extend the literature on part-time entrepreneurship by introducing venture-level characteristics beyond industry (Raffee and Feng, 2014) and the institutional setting as drivers of entry choices of entrepreneurs. In contrast to my expectations, I find that the family context of the entrepreneurs has no significant influence on the initial choice between a part-time or full-time entry. The factors that are found to significantly affect this choice are whether the entrepreneur is entering out of necessity or because she pursues an opportunity. The necessity-driven entrepreneur chooses more often for a full-time entry than the one pursuing an opportunity. Similarly, I find that an already self-employed entrepreneur is more likely than a previously employed one to create a new venture in full-time. On the venture level, I find no support for influence of the type or novelty of the good produced, while the entry behaviour of co-entrepreneurs has a very strong influence on the initial entry choice.

The transition behaviour of part-time entrepreneurs to full-time entrepreneurship, on the other hand, is influenced by her family situation. Necessity-driven entrepreneurs are not only unlikely to enter entrepreneurship in part-time, they are also unlikely to remain part-time entrepreneurs if they initially chose for a part-time entry. A prior self-employment also influences the transition decision, albeit in such a way, that already self-employed entrepreneurs are slower to transition to a full-time commitment to the new venture.

Furthermore, I draw on the Varieties of Capitalism literature to show that entrepreneurs in different institutional settings tend to make different choices when it comes to how they enter entrepreneurship. Similarly, I analyse in how far the choice to transition from part-time to full-time entrepreneurship, is influenced by institutions. Entrepreneurs in CMEs are more cautious to forego the opportunity to earn income through wage work and are both less likely to enter entrepreneurship in full-time and in a second step to transition from part-time to full-time. With this finding I make a second contribution: The finding shows that the “Varieties of Entrepreneurship” as introduced by Dilli et al. (2018) extends beyond the type of ventures created, to the entry decisions taken by entrepreneurs themselves. In the light of this finding, policy makers should be aware that the institutional setting not only has an effect on the overall level of entrepreneurial activity but also on the type of entrepreneurship (see also Herrmann, 2019). While part-time entrepreneurship might not yield immediate contributions to economic growth comparable to that of full-time entrepreneurship, it can help to lower the failure rate of ventures and limit the resources spent on unsuccessful ventures. Interestingly, the institutional setting seems more influential later in the venture creation process of nascent ventures. While it does not influence the entry choice of the original entrepreneurs, it does change the initial choice of joining entrepreneurs and the transition choice of both groups of entrepreneurs. This temporal aspect seems like a promising avenue for future research.

In addition, the paper contributes to the literature on the dynamics of team formation in nascent venture by shedding light on the differences in entry and transition behaviour of entrepreneurs who enter the venture at different points in time. While original entrepreneurs are initially more hesitant to enter in full-time, they are more likely to transition out of part-time entrepreneurship into full-time entrepreneurship. This can be explained from a real options perspective with the additional knowledge about the worth of the entrepreneurial opportunity joining entrepreneurs have, compared to original entrepreneurs, when they face the entry decision. Original entrepreneurs are confronted with a high degree of uncertainty when creating the venture, as a result they try to learn more about the opportunity’s value while limiting their risk through a part-time entry. Once joining entrepreneurs have to decide how much time they want to commit to the venture more is known about the opportunity’s value, which helps them to choose the appropriate time commitment. In turn, this makes an adjustment of the time commitment at a later stage less likely. Overall, I find no systematic moderation effect of the point of entry on the factors driving the entry choice. However, my result show that original and joining founders are affected by different factors and display distinct entry behaviours. Exploring the differences in behaviour and characteristics between these two groups of entrepreneurs can help future studies to provide us with a clearer picture of how different people enter entrepreneurship in distinct ways.

2.5.2 Limitations

Despite these contributions, this paper is not without limitations. Although I do account for the differences in the most recent occupation, the data does not allow me to distinguish more precisely between hybrid entrepreneurs who enjoy additional income and other part-time entrepreneurs without additional wage income. Future research can extend our knowledge about the real options considerations of entrepreneurs by analysing more precisely the influence the presence or absence of additional wage income has in the entry choice. With regard to the options an entrepreneur has in her entry choice, I do not include the option of deference, in other words a non-entry to entrepreneurship. Neither can I model the likelihood of exit from entrepreneurship in the second decision making point.

The number of countries in this analysis is limited to one, respectively two, per variety of capitalism. Future research would benefit from broadening this set of countries. A broader set of countries would then allow researchers to replace country dummies with measures for more specific institutional settings such as labour protection regulations or the welfare state.



CHAPTER 3

Team Formation Processes in New Ventures

This chapter is based on: L. Held, A.M. Herrmann, A. van Mossel. (2018): Team formation processes in new ventures. *Small Business Economics*, 51(2): 441-464.

ABSTRACT

The political economy literature on 'Varieties-of-Capitalism' demonstrates that, and how, the composition of a firm's human resources is shaped by national labour-market institutions. As these institutions drive firms to pursue human-resource strategies, in line with the comparative advantages offered, systematic differences exist between countries in the skill profiles of corporate workforces.

Importantly, though, this causal link has only been established for incumbent firms, whereas the process of skill composition in start-up ventures remains understudied. While entrepreneurship research theorizing about the team formation in start-up ventures exists, such studies mostly focus on different outcomes of team formation, for example the number of employees. Questions about how team formation processes unfold and the factors, such as labour-market institutions, influencing their evolution remain unanswered.

To address this research gap, we analyse the venture creation processes of 344 ventures in Germany and the US, offering particularly typical examples of countries with regulated and deregulated labour-market institutions respectively. Based on optimal matching techniques, we illustrate how team formation processes differ over time in terms of founder and employee involvement and the hiring of service providers. Furthermore, we use binary logistic regressions to identify the extent to which national labour-market institutions account for these differences.

3.1 INTRODUCTION

With his seminal article “Who is the entrepreneur is asking the wrong question”, Gartner (1988) initiated a new paradigm in entrepreneurship research. Instead of focusing on the characteristics of entrepreneurs, scholars began to research the entrepreneurial process. While it is now widely accepted that entrepreneurship is a process that unfolds over time rather than a singular act, different conceptualizations of the process have emerged (Moroz and Hindle, 2012). We here follow the conceptualizations of entrepreneurship as the process of venture creation (VCP), a conceptualization now considered to be central to entrepreneurship research (Davidsson and Gordon, 2012).

Among those who understand entrepreneurship as the creation of ventures, a variety of ways to define and operationalize VCPs exist and our knowledge about it remains limited (Samuelsson and Davidsson, 2009). The literature on VCPs and venture growth has produced a variety of perspectives on how ventures are created, of which the two most prominent ones are stage based models and activity based models (Moroz and Hindle, 2012). Stage based models postulate that all ventures, just like organisms, go through the same, predetermined stages in their development (Levie and Lichtenstein, 2010). Hence, the underlying concept of VCPs is a passive one that assumes a ‘natural’, almost automatic progression through the different stages, thereby putting little emphasis on the activities and choices of the entrepreneur. In contrast, activity-based models conceive a VCP as the number and sequence of singular gestation activities occurring throughout the VCP (Carter et al., 1996). The result is a rather active VCP concept explicitly focusing on the actions of the entrepreneur. In fact, this approach defines the VCP as the accumulation of singular activities that the entrepreneur chooses to undertake from an eclectic list of gestation activities. Despite these substantial differences, neither perspective has yet produced a coherent, widely accepted conceptualization of the VCP (Davidsson and Gordon, 2012; Levie and Lichtenstein, 2010).

The most recent literature on venture creation argues that this conceptual failure has methodological origins: Existing studies do not analyse the VCP as the unit of analysis but rather treat entrepreneurship as a linear succession of distinct stages or a number of singular gestation activities (Garney et al., 2006; Hjorth et al., 2015; McMullen and Dimov, 2013). This often leads to the use of methods not optimal for studying processes (Gordon, 2012; Langley et al., 2013; Van de Ven and Engleman, 2004): More concretely, Aldrich (2001) distinguishes between outcome-driven (or variance) explanations and event-driven (or process) explanations. While variance-driven studies are suitable to explain change through deterministic causation, event-driven studies consider every action and how they form one process unit (Poole et al., 2000). Because the vast majority of publications have employed

variance explanations, they are able to answer questions about antecedents and outcomes of the entrepreneurial process, but little progress has been made to explain how said process unfolds (Ruef, 2005; Van de Ven and Engleman, 2004).

Furthermore, it has been argued that important heterogeneities between different ventures and venture creation contexts make it difficult to uncover patterns in VCPs. In order to be able to produce meaningful descriptions of VCPs, different characteristics of ventures, as well as the context of their creation, need to be taken into account and controlled for (Gartner and Shaver, 2012; Samuelsson and Davidsson, 2009).

Taken together, the different literature strands on VCPs thus provide inconclusive results about whether VCPs are 'order or chaos'. Yet, this question has become ever more important in view of the increasing number of countries that implement policies to stimulate economic growth through entrepreneurship. While the differences in the level of entrepreneurial activity between countries are well documented, the lack of knowledge about VCPs means that we do not know whether the processes underpinning entrepreneurial activity also differ between countries. We need to understand if, and how, national institutions shape VCPs in order to decide whether one optimal blue print for the stimulation of entrepreneurship exists, or whether entrepreneurship policies have to be adapted to VCPs shaped by national institutions.

In order to address this research gap, we focus on the most essential process within venture creation, namely the one of team formation (TFP). The process of team formation describes the assembly of a venture's most crucial resource: human capital. A great number of studies have found that the human capital embodied by a venture's founders is the most significant predictor for a venture's survival and growth (Bates, 1990; Bosma et al., 2004; Colombo and Grilli, 2005; Cooper et al., 1994; Delmar and Shane, 2004). Building on these insights, recent studies on team formation argue that employees contribute in similar fashion to a venture's human capital and subsequently its survival (Coad et al., 2016; Dahl et al., 2015; Koch et al., 2013; Weber and Zulehner, 2010). Consequently, we conceptualize the team formation process as the time commitments of founders, employees and service providers at any time between inception of the venture and the point it reaches profitability or exits.

Accordingly, our research addresses the above gaps in the VCP literature by asking:

Do distinct types of team formation processes exist, how do they differ, and which structural characteristics can explain these differences?

Our paper answers these questions by taking a new methodological and empirical approach: We apply optimal matching (OM) and clustering techniques to the novel data of the 'Perfect Timing' dataset, reporting the venture creation processes of 344 start-up ventures on a monthly

basis. Owing to OM analyses and clustering techniques, we are able to study entire VCPs as the unit of analysis and thus, to explore distinct team formation processes on the basis of the team formation activities undertaken, their timing and duration.

In summary, these OM analyses demonstrate that team formation is 'order' rather than chaos as distinct temporal patterns of team formation exist with regard to the time commitment of founders as well as the extent to which employees and service providers are hired. Importantly, we are able to explore a distinct number of approaches for each of these three team-formation dimensions. Furthermore, correlation and regression analyses illustrate that the approaches in one dimension are only weakly correlated to the approaches of the two other dimensions: We observe additivity effects between founder involvement and employee hiring, while the data indicates that substitution effects exist between the hiring of employees and service provider engagement. Finally, binary logistic regression analyses reveal that structural characteristics, in particular the venture's institutional environment and innovativeness, influence which team formation approach is pursued.

To illustrate these findings the paper proceeds as follows: In section 2, we begin with a short review of the literatures on entrepreneurial processes in general and team formation in particular. In doing so, we highlight the opposing views of the stage-based and activity-based approaches. In section 3, we present the data and methodology employed, while we present our results in section 4. In section 5, we discuss these findings and their limitations in the context of previous research and the methodology used. Importantly, we also reflect on the opportunities for future research based on OM techniques.

3.2 THEORY

In the following section, we introduce the theoretical building blocks required to explore team formation processes in ventures. As illustrated in Figure 3.1, we summarize in a first step, the literatures discussing different types of team formation. Focusing on its three core dimensions – founder, employees and service provider involvement – we formulate *Proposition 1*: that distinct types of team formation exist for each dimension. With that in mind, we review in a second step, the literature that discusses possible interdependences between approaches (*Proposition 2*). In a last step, we review the literatures on possible influences of structural characteristics upon team formation, in particular labour-market regulation, nature of the venture’s good and innovativeness (*Propositions 3-5*).

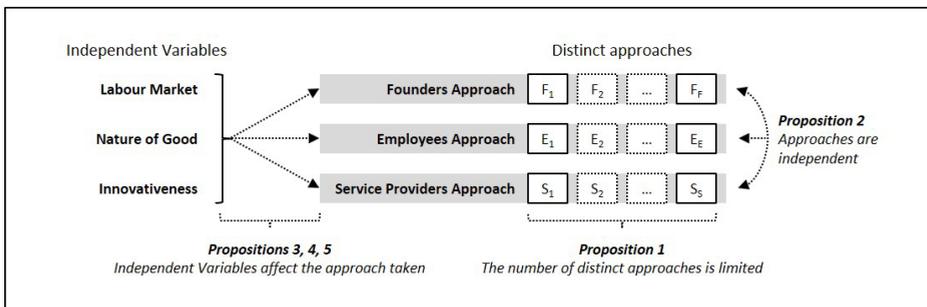


Figure 3.1 Theoretical Building Blocks of Team Formation Processes

What do the different literature strands on team formation processes (TFPs) teach us about how these may evolve? Is team formation random or evolving along systematic trajectories? The *stage-based literature* was the first to address this question. Here, venture creation in general, as well as team formation in particular, are commonly depicted as a series of prescribed stages (Levie and Lichtenstein, 2010; Phelps et al., 2007). With regard to team formation, many stage models describe a process of continuous growth which, in the beginning, is centred on the role of the founder(s). Kazanjian and Drazin (1990) and Kaulio (2003), for example, posit that, during the first stage of venture creation, the founder(s) work on a prototype or idea. Once the prototype has been created, more founders or core employees join the team in order to work on the products' commercialization during the second stage. Once a commercially viable product has been created, the venture enters into the stage of growth, during which more employees and service providers join to the team. Hence, team formation is described as a linear process during which the team grows from one to many founders who increasingly hire employees as time goes by.

The *gestation activity literature* instead portrays team formation as non-linear processes which are characterized by a variety of activities such as organizing the founder team, switching between part- and full-time work and hiring employees, all of which can occur at different moments (Carter et al., 1996; Gatewood et al., 1995; Reynolds and Miller, 1992). While these studies establish that more than one team formation process exists, they only provide snapshots into the frequencies with which different team formation activities take place at different moments of the process.

To give some examples, Gartner et al. (2004) analyse the first start-up activity carried out by new ventures and find that only few ventures start with activities related to team formation, such as 'organizing the start-up team' (6%), getting 'devoted full-time' (2%) or 'hiring employees' (<1%). Another study investigates the sequence of individual start-up activities, distinguishing between successful, interrupted and ongoing venture creation processes: In this study, Carter et al. (1996) illustrate that the majority of successful ventures organize the founder team in the second quarter after venture inception, while at least one founder switches to full-time work at the same time. In the following quarter, the first employee is hired. In contrast, founders who give up on venture creation mostly organize the founder team in the first month after inception but wait for one year before switching to full-time work. By contrast, founders of unsuccessful ventures, characterized by ongoing venture creation processes, organize the founder team in the second quarter after venture inception but never switch to full-time work, nor hire any employees.

In summary, while some scattered evidence exists, systematic insights into how team formation evolves over time with regard to founder involvement, the hiring of employees or other types of labour are still missing (Gordon, 2012; Jaspers and Hak, 2013). That said, it is interesting to note that the activity-based literature agrees with the stage-based literature in that team formation processes are not random but follow distinct patterns. Yet, contrary to the stage-based literature, the activity-based literature holds that these patterns do mostly not follow a linear growth process and are context-dependent (Gartner and Shaver, 2012; Liao et al., 2005).

Beyond the stage- and activity-based literatures, various research strands provide insights into individual aspects of team formation without explicitly positioning their findings within the overall team formation process. These aspects include: the development of founder teams, the time commitment of founders including part-time entrepreneurs as well as their transition to full-time entrepreneurship, the hiring of employees, and the engaging of service providers.

Those few studies that analyse the development of founder teams illustrate that founder exit is more likely than founder entry throughout the TFP (Hellerstedt, 2009). Furthermore, the initial number of founders seems to influence subsequent founder exit and entry. However,

the exact effect remains unclear: While some authors argue that the likelihood of founders exiting or additional founders joining the team is higher for bigger teams (Chandler et al., 2005; Hellerstedt, 2009), others observe the opposite effect (Ucbasaran et al., 2003). Yet researchers, investigating founder team development, largely concur in their observation that the number of founders overall remains stable throughout the TFP in most ventures (Hellerstedt, 2009).

A further research strand, known as the literature on part-time or hybrid entrepreneurship, illustrates that not only the number of founders can vary throughout TFPs, but also their time commitment. Wennberg et al. (2006) were one of the first to argue that besides the traditional dichotomy of being an employee or a full-time entrepreneur, the possibility of creating a venture in part-time exists. Several empirical studies show that a significant share of founders actually choose to do so, whereby the exact share of part-time founders (or hybrid entrepreneurs) varies strongly between countries. In Germany, for example, 64% of ventures created in 2013 were set-up by part-time founders (Metzger, 2014). The opportunity to test one's own abilities as a founder, while reducing the financial and labour-market risks related to full-time entrepreneurship, is mentioned amongst the most important motives for part-time entrepreneurship (Folta et al., 2010; Raffiee and Feng, 2014).

More recent studies on hybrid entrepreneurship show that entrepreneurs do not necessarily remain part-time or full-time entrepreneurs for the entire duration of the TFP, but increase or decrease their time commitments throughout the TFP (Block and Landgraf, 2016; Folta et al., 2010). For example, Block and Landgraf (2016) find that 20% of full-time founders in their study of German founders initially started out as part-time founders, whereby it remains unknown when these switches from part-time to full-time entrepreneurship occurred.

Even though considered a key decision for young ventures, surprisingly little is known about the hiring of employees (Cardon and Stevens, 2004). One problem is that most studies exploring the initial size of ventures ignore (very) small ventures which arguably make up the vast majority of ventures. Consequently, only scattered evidence exists about the extent and timing of employee hiring. The study by Melillo et al. (2013) on Swedish ventures in knowledge-intensive industries (1994-2001) encompasses ventures of all sizes, including one-person ventures. It concludes that 93% of ventures do not hire any employee during the first year of their existence. The remaining 7% of ventures involve one (5.3%), two (.89%), three (.4%) or 4 or more employees (.54%) during the same time span. Following Swedish ventures created in 1998 over the first 2 years of their existence, Delmar and Shane (2003) report the following development of average employee number: At their inception, ventures hire an average employee capacity of .17 FTE, which increases over the following six months to .51 FTE. In month twelve, the average employee capacity hired further increases slowly to .73 FTE, before jumping up to 3.2 FTE in month 18. Interestingly, the average employee number hired then drops to 1.62 FTE in month 24, i.e. the

last observation point. Finally, the findings of (Cooper et al., 1989) illustrate that US ventures which in the first year hire three employees or less grow more strongly during the remaining TFP, both in relative and absolute terms, than ventures that start out with more employees.

The existing evidence regarding the involvement of external service providers in team formation is even more scattered than for the hiring of employees, whereby scholars agree about the importance of service providers as an external source of labour: Cassar and Ittner (2009) demonstrate that a large number of new ventures in the US engage, or plan to engage, accountants (64%) and lawyers (46%) in their quest for profitability. At what point in the TFP the initial engaging of accountants occurs seems to strongly coincide with events like initial sale or opening of the ventures bank account. Furthermore, Bennett et al. (1999) show that small and medium sized companies in the UK tend to make use of multiple external service providers and that the use of external service providers is positively related to the number of employees: The higher the number of employees, the more likely that a service providers is engaged. Cooper et al. (1989) come to the same conclusion in the US context.

While the existing studies provide valuable insights into TFPs, indicating that team formation in ventures is neither chaos nor unidimensional order, it remains unclear what and how many, distinct approaches to TFP exist, and what they look like. Based on the available evidence on TFPs, we expect that:

Proposition 1: *distinct types of team formation rather than unsystematic approaches exist in which (a) founders commit themselves to venture creation, (b) employees are hired and (c) service providers are engaged during the venture creation process.*

If we are right in that team formation processes follow distinct pathways with regard to founder involvement, employees hiring, and the engagement of service providers, the question arises of how these three channels relate to each other. Does the way in which founders contribute to venture creation influence the extent and timing of employee hiring and service provider engagement? And does the hiring of employees correlate with the engagement of service providers: For example, can we observe substitution or additive effects with regard to the involvement of internal labour (founders and employees) and external labour (service providers) throughout the TFP? Or are the approaches to founder involvement, employee hiring and service provider engagement unrelated to each other?

While specific research into the relationship between founder, employee and service provider involvement during venture creation does not exist, different and often contradicting approaches to aggregate team formation have been described in the literature. On the one hand, studies describe additive effects in high-growth ventures where higher founder commitment co-

occurs with extensive employee growth and service provider engagement (Cooper et al., 1989; Reynolds and White, 1997). On the other hand, scholars observe substitution effects in ventures with growth aspirations between the hiring of employees and engaging service providers as ventures try to avoid high ancillary wage costs and employee protection (Román et al., 2011). In line with these insights, we expect that

Proposition 2: (a) *the time commitment of founders and the hiring of employees is additive, while (b) the time commitment of founders and service providers is not related, whereas (c) the hiring of employees and service providers is substitutive throughout the venture creation process.*

Should we be able to identify systematically different approaches to founder, employee, and service provider involvement during venture creation, the question arises how to explain which approach is chosen: Under which conditions do founders engage in one rather than another way of setting up their venture? And under which conditions do they hire no, some, or many employees and service providers respectively? In other words, which influence does a venture's context and its characteristics have on the approaches chosen towards team formation? A wide variety of VCP studies have pointed out, that part of the struggle to establish coherent patterns in VCP stems from the negligence of differences in the context and characteristics of the studied ventures (Gartner and Shaver, 2012; Ruef, 2005; Van de Ven and Engleman, 2004). Among the most prominent factors identified in the entrepreneurship literature are: national institutions, a venture's innovation strategy and the type of product developed (Ruef, 2005; Samuelsson and Davidsson, 2009).

To begin with, the influence of *national institutions* on venture creation processes (in our case the influence of labour-market institutions on team formation processes) the 'Varieties-of-Capitalism' (VoC) literature has long established that companies follow distinct human resource approaches as a reaction to different types of labour-market regulations (Estévez-Abe and Iversen, 2001; Hall and Soskice, 2001; Herrmann and Peine, 2011). Other than a recent study by Dilli et al. (Dilli et al., 2018) these studies focus on incumbent firms rather than start-up ventures, their reasoning however is compatible with various entrepreneurship studies on how the rigidity of national labour-market institutions may influence team formation in new ventures.

With regard to institutional influences on founder involvement, real options theory assumes that an individual will choose entrepreneurship over dependent employment if the potential rewards of starting a venture outweigh the related risks (Wennberg et al., 2006). In line with the reasoning of the VoC literature, this implies that strong employment protection – in the form of strong unions, centralized wage bargaining, long notice periods and limited reasons

for dismissal – makes dependent employment more attractive vis-à-vis entrepreneurship (Wennekers et al., 2005). At the same time, strong labour-market regulations also makes the hiring of employees relatively more costly for entrepreneurs which, in turn, makes entrepreneurship less attractive (Henrekson et al., 2010; van Stel et al., 2007). Both effects imply that the level of certainty about a venture's profitability has to be higher in rigid labour-markets than in liberal ones for prospective founders to give up their jobs in favour of committing themselves to venture creation (Román et al., 2013). One way of increasing certainty about one's entrepreneurial abilities and the venture's profitability, without giving up the benefits of dependent employment, is part-time entrepreneurship (Raffiee and Feng, 2014). Hence, part-time entrepreneurship seems more likely in regulated than in flexible labour markets.

With regard to institutional influences on employee hiring, the VoC reasoning is compatible with the insights of several entrepreneurship studies: that rigid labour-market institutions reduce a venture's growth ambitions and the extent to which employees are hired (Baughn et al., 2010; Bosma and Levie, 2009): Strong employment protection reduces the venture's flexibility to dismiss employees in response to changes in the business environment or in case of low employee performance (Estévez-Abe and Iversen, 2001; Hall and Soskice, 2001). This, in turn, increases the risks of hiring employees (Davidsson and Henrekson, 2002; Henrekson et al., 2010). Accordingly, Bornhäll et al. (2016) point to the Swedish case, where employment protection (in this case exemptions from the last-in/first-out principle) becomes more severe once a venture employs more than 10 workers: Accordingly, the authors illustrate that the likelihood of hiring employees decreases significantly once ventures come close to this threshold which, in turn, illustrates the negative influence of rigid labour-market institutions on employee hiring.

Similarly, labour-market institutions have been found to influence the attractiveness of engaging external service providers compared to employees. Based on a principal-agent model, Parker (2010) illustrates that rigid labour-market institutions increase the tendency of firms to hire external service providers in order to circumvent employment constraints, such as payroll taxes. In line with these findings, Román et al. (2011) show that rigid labour-market institutions encourage companies to re-hire employees as self-employed service providers instead of extending employment contracts. Given that employment protection becomes more severe once ventures reach specific employee thresholds, and given that the consequences of hiring under-performing employees are more severe for small ventures than for large firms (Davidsson and Henrekson, 2002), it can be expected that the preference of hiring service providers rather than employees is particularly acute in new ventures.

The above reasoning leads us to expect that

Proposition 3: *national labour market institutions influence (a) the approach of founders towards committing themselves to venture creation, (b) the approach of founders towards hiring employees and (c) engaging service providers during venture creation.*

Also, the *nature of the good (product or service)* developed has been found to influence the number and type of gestation activities carried out – and thus the participation of founders and employees – during venture creation (Gordon and Davidsson, 2013). On the one hand, ventures developing products require more resources than service developers (Ruef, 2005); on the other, they are also more likely to pursue growth strategies due to their stronger need to achieve economies of scale (Audretsch et al., 2004). Consequently, a study of the Dutch hospitality sector finds that the growth patterns of small service ventures differ from those of small manufacturing ventures (Audretsch et al., 2004).

With regard to the involvement of founders in venture creation, Petrova (2012) explains how the more limited need for resources and slow growth trajectories lead to significantly higher shares of part-time entrepreneurs running business service rather than manufacturing ventures. These findings are supported by Germany's self-employment statistics in 2008, where the share of part-time entrepreneurs amounted to 15% in manufacturing and 36.2% in service ventures (Buddensiek et al., 2013).

With regard to the hiring of employees, Fritsch and Weyh (2006) illustrate that, on average, German manufacturing ventures do not only start out with more employees than their service providing counterparts; they also follow different growth trajectories during their first years of existence, so that the number of employees increases more substantially in product manufacturing than in service providing ventures.

The above reasoning leads us to expect that

Proposition 4: *the nature of a good a venture intends to sell influences (a) the approach of founders towards committing themselves to venture creation, (b) the approach of founders towards hiring employees and (c) engaging service providers during the venture creation.*

Finally, the *innovativeness of a venture's business idea* is also likely to influence the team formation approaches chosen. The innovation literature highlights that those ventures which develop new business ideas, rather than imitating existing ones, can either be radically or incrementally innovative. While incremental innovators improve existing (technologies of) business ideas, radical innovators develop entirely new ones (Abernathy and Clark, 1985). Depending on the type of innovation a venture develops, it faces different challenges (Amason et al., 2006;

Samuelsson and Davidsson, 2009). Ventures developing radical innovations mostly require tacit knowledge (Mascitelli, 2000), because “*most knowledge is created and stored within individuals*” (Grant, 1997). Therefore, the configuration of ventures’ internal labour resources, that is founders and employees, is especially relevant for innovative ventures (Andries and Czarnitzki, 2014).

With regard to founder involvement, this implies that founders need to carry out more and a broader range of gestation activities (Amason et al., 2006; Samuelsson and Davidsson, 2009) in order to master the higher levels of uncertainty and complexity related to radical innovations (Liao and Welsch, 2008; Samuelsson and Davidsson, 2009). Consequently, ventures developing radically innovative business ideas are more likely to be created by large founder teams, because they tend to have more, and more diverse, resources at their disposal (Eisenhardt and Schoonhoven, 2006; Wiersema and Bantel, 1992).

In line with this reasoning, ventures developing radical innovations also hire employees earlier and more substantially (Freel and Robson, 2004). Given that the building up of tacit knowledge is both cost- and time-intensive, it only pays off for ventures if employees are retained over longer time periods (Becker, 1962; Virtanen et al., 2003). Consequently, radically innovative ventures can be expected to retain their employees for longer time periods than incrementally innovative ventures or imitators.

Accordingly, innovative ventures rely less on external service providers than imitative ventures, because the latter are more willing to accept limited tacit knowledge in return for the increased flexibility to increase, or decrease, their pool of external service providers (Chandler et al., 2009). The above reasoning leads us to expect that:

Proposition 5: *the innovativeness of a venture’s business idea influences (a) the approach of founders towards committing themselves to venture creation, (b) the approach of founders towards hiring employees and (c) engaging service providers during the venture creation.*

3.3 METHODOLOGY

3.3.1 The Data: Sample and Operationalization

To test the aforementioned propositions, we use a subset of the “Perfect Timing” (PT) database. Based on computer-assisted telephone interviews with founders, this dataset was collected between 2012 and 2016 by an international research team located in Utrecht (The Netherlands), New York (US), Germany (Düsseldorf and Cologne), London (UK), and Palermo (Italy). In order to capture possible variations in venture processes, the population chosen includes ventures of all legal forms (excluding sole proprietorship) that were registered between 2005 and 2011 in the information technology (IT) and alternative energy (AE) industries in Germany, and the US. Out of this population, founders were randomly selected and invited to participate in an interview about the venture creation process of their company until a representative sample of 344 cases had been obtained.

The data’s explicit focus on the timing and sequencing of venture creation activities enables us to study patterns in TFPs. Importantly, the dataset is restricted to the duration of the team formation process of each venture included. More concretely, this time span starts with the first time a founder, employee or service provider actively worked on venture creation and ends with the moment in which the venture in question generated sustainable profits (defined as 3 consecutive profitable months). If a new venture never made sustainable profits, three alternative TFP ends can occur, namely the acquisition, merger or liquidation of the respective venture. Had none of these events occurred, a TFP is categorized as ongoing until a maximum duration of 84 months. With regard to the team formation activities undertaken during the venture creation process, the dataset reports when each founder, employee, and external service provider started and, if applicable, stopped working for the new venture on a full-time or part-time basis.

To identify typologies of TFPs (dependent variable), we measure each venture’s team formation activities by determining how many founders, employees, and service providers are involved at each month of the venture creation process. To this end, we first calculate the amount of time, expressed in full-time equivalents (FTE), invested in venture creation by each of the venture’s founders. Second, we calculate the extent of employees hired (in FTEs) and, third, the number of service providers carrying out tasks for the new venture. For both the founder and employee dimension, we account for full-time as well as part-time arrangements (recorded as 0.5 FTE involvement). Our dataset thus records the extent of founder and employee involvement in increments of 0.5 from 0 to 5 FTE. For service providers, we record the number of service providers, because part-time arrangements are difficult to measure for external labour.

Table 3.1 Example of Team Formation Process

Dimension (in FTE)	Month										
	1	2	3	4	5	6	7	8	9	10	11
Founder	0.5	0.5	2	2	2	2	4	4	4	4	4
Employee	0	0	0	0.5	0.5	1.5	1.5	1.5	1.5	1.5	1.5
Service Provider	1	1	0	0	0	0	0	1	2	2	2

Given that venture creation processes were recorded on a monthly basis, we considered only the first five founders, employees, and service providers contributing to venture creation, so that 5.0 FTE also captures labour involvement of more than 5.0 FTE. As such, the dimensions reporting founder and employee involvement each have 11 states (ranging from 0 FTE to 5.0 FTE), while they have 6 states for contributions of service providers (ranging from 0 to 5 service providers). Table 3.1 provides an example of how these team formation activities are reported for a venture that achieved profitability after 11 months.

We report the team formation activities for each of the 344 ventures included in our database. Table 3.2 provides some descriptive statistics of the TFPs of all ventures analysed, whereby the average TFP in the sample has a duration of 32.6 months. As Table 3.2 shows, TFPs are often small as the most common state for both the employee (67.1%) and service provider (46.1%) dimension is the involvement of 0 team members. For the founder dimension, the involvement of one founder at 1 FTE (33.4%) is the most frequent state. The average founder involvement throughout the TFP is 1.5 FTE, in contrast to the much lower levels of employee involvement (.72 FTE) and service provider contribution (.95 SP).

Table 3.2 Distribution of TFP states by dimension

Number of Team Members (in FTE)	Founder	Employees	Service provider
0	1.7%	67.1%	46.1%
0.5	15.8%	4.0%	
1	33.4%	10.0%	26.7%
1.5	17.2%	2.9%	
2	12.3%	5.7%	17.2%
2.5	7.9%	.9%	
3	7.3%	3.1%	6.6%
3.5	1.5%	.6%	
4	2.1%	2.8%	3.1%
4.5	.1%	.1%	
5	.6%	2.8%	.4%
Total	100%	100%	100%

We measure the different contextual factors (independent variables) that may influence which TFP is pursued by a new venture as follows. In order to measure the impact of labour market rigidity or, respectively, flexibility, we follow the standard approach of the Varieties-of-Capitalism literature which takes a country as a *pars pro toto* for its institutional environment (Hall and Soskice, 2001). In doing so, Germany is considered to be the most typical example of regulated labour-market institutions (Estévez-Abe and Iversen, 2001), while the United States are considered to be the most typical example of labour market flexibility. Accordingly, we measure the flexibility of labour-market institutions by the country in which a venture is located, coding Germany as '0' (limited labour-market flexibility) and the US as '1' (indicating flexible labour-market institutions).

The innovativeness of a venture's business idea was determined in a three-step process. In the first step, the founder was asked whether his business develops a radically new, incrementally new, or imitative product or service.¹ In a second step, the interviewer (upon completion of the interview) cross-checked the founder's answer by comparing the venture's innovativeness with the innovativeness of the other ventures about which s/he had conducted interviews. In a third step, the person cleaning the data, again, cross-checked the degree of innovativeness indicated against the classification scheme he had developed while cleaning the data. In both step two and step three, the interviewer and the data cleaner relied on the information provided by the founder as well as on online information about the venture's business idea. This three-step process made it possible to minimize the over-estimation bias that typically occurs when founders self-report the level of their business' innovativeness. The degree of innovativeness was measured as imitation (0), improvement (1), or radical innovation (2).

The same three-step process was used to determine whether the new venture develops a product, a service, or a business idea that combines elements of product and service. Given that the number of ventures that only develop products is fairly limited (22.4%), we code the nature of good developed as a dichotomous variable, distinguishing between pure service ventures (0) and those ventures that either offer products or services and products (1).

Furthermore, the following control variables are included: Possible industry differences in TFPs are controlled for by assessing whether the venture is active in the ICT industry (0) or the alternative energy industry (1). Furthermore, we assess whether a venture started independently (0) or as a spin-off (1), and whether a venture was registered in a year of well-being (0) or economic crisis (1).

1 Concrete question asked in the questionnaire: 'How would you describe the degree of novelty of your venture's core business idea?'

Table 3.3 Descriptive Statistics of Independent and Control Variables

		N	Mean	Std. Dev.	Correlation Coefficient				
					1	2	3	4	5
Control variables									
1	Industry ^a	344	.29	.453					
2	Spin-off ^a	344	.09	.291	-.071				
3	Crisis ^a	344	.41	.493	-.034	-.023			
Independent variables									
4	Labour Market ^a	344	.4	.491	-.131**	-.121**	.036		
5	Innovativeness ^b	344	.64	.646	-.211***	.089*	-.063	.038	
6	Nature of Good ^a	344	.49	.501	.078	.064	-.114**	-.245***	.239***

a Pearson's r. *b* Spearman's rho. *p*-values *** < .01, ** < .05, * < .1.

Table 3.3 provides some descriptive statistics about the independent variables used in the below logistic regression analyses. Furthermore, we tested for multicollinearity, finding that not a single variance inflation factor exceeded the traditionally accepted value of 1.2 points, so that multicollinearity does not appear to be a problem.

3.3.2 Analyses

In line with our theoretical illustrations, we run three different types of analyses:

(1) In a first step, we assess whether a limited number of systematically different TFPs approaches exist to founder involvement, employee hiring, and service provider engagement (*Propositions 1a – 1c*) and illustrate how they look like. To this end, we use optimal matching (OM) techniques combined with cluster analyses, whereby each of the three TFP channels (founder, employee, and service provider involvement) constitute the respective units of analysis. The OM algorithm measures the distance between processes. If subsequently paired with cluster analyses, such sequence analyses allow us to explore and interpret patterns in longitudinal data (Halpin, 2010).

Thus far, OM has mostly been used in sociology to explore career patterns (Abbott and Hrycak, 1990; Biemann et al., 2012; Blair-Loy, 1999; Pollock, 2007; Stovel and Bearman, 1996). Only recently, Gordon (2012) applied OM techniques to explore gestation activities in venture creation processes. Given that more wide-ranging developments and applications of OM algorithms only occurred after the year 2000, OM can still be considered a fairly young method. Nevertheless, a standard way of running sequence analyses, based on OM techniques, has crystallized, which we here follow (Biemann and Datta, 2014). It includes four steps:

Step 1: Coding the Data

The first step consists in reporting the team formation process of each venture on a monthly basis. More concretely, this means that a sequence of states needs to be created for each of the three dimensions (founder, employee, service provider involvement) of the TFP of each venture. As outlined above, this process can vary in length for each venture, because it reports the (founder, employee, service provider) state for each month of the venture's TFP – in FTE for founder and employee involvement and in absolute numbers for service providers (see Table 3.1).

Step 2: Define the Substitution Costs

In order to measure the distance between two TFP sequences, created in Step 1, a cost needs to be assigned for replacing one state by any other state with the aim of transforming one sequence into the other. These so-called substitution costs range from 0 to an arbitrary maximum (here: 2) and are often estimated on the basis of the frequency of transitions between two states within the entire dataset. In our case, the sequence states represent equally-sized steps along a continuous scale. This allows us to calculate the substitution costs as a linear interpolation between the minimum substitution cost for equal states (0) and the maximum substitution cost (2) for the most distant states, as given by the number of FTEs difference between the two states. To provide an example: replacing the minimal employee involvement of 0 FTE with the maximum of 5.0 FTE would have a cost of 2. Reducing the distance between two states by 0.5 FTE decreases the costs of exchanging these states by 0.2. Subsequently would the costs of replacing 0 FTE with 4.5 FTE be 1.8, 0 FTE with 2.5 FTE be 1 and so forth.

Step 3: Calculating Sequence Similarity

Based on these substitution costs, we then calculate (for each of the 344 sequences in our dataset) how costly it is to transform one sequence into any of the other 343 sequences. We do this for the founder, employee, and service provider dimension separately. The cost of transforming one sequence into the other expresses their respective distance. To calculate the distance of sequences that differ in length, we calculate their distance based on the length of the shorter of the two sequences. This reflects that the shorter of the two TFPs is unknown beyond the period observed and should thus not influence the difference measure. This novel solution addresses an often voiced concern of using OM for analysing sequences in social science that vary greatly in length (Aisenbrey and Fasang, 2010).

Furthermore, we normalize the respective values of sequence difference by dividing them by the length of the shorter of the two sequences in order to maintain a comparable difference measure across sequence pairs. This results in three matrices (one for founder, employee, and service provider involvement respectively) which report the distances between each sequence pair.

To provide an example, consider two team formation processes, where the hiring of employees evolves as a four-month process, namely (in FTE) 1-1-2-2, in the first venture and as a three-month process 1-3-3 in the second venture. When we calculate their difference, we restrict the calculation to the number of months observed in the shorter of the sequences, in this case the first three months. Given that the states of the first period are identical, namely 1 FTE employee, their distance is zero. The states of the respective second period are 2 FTE apart, resulting in a transformation cost of 0.8 to equate the states (as reminder to the reader, the transformation costs are 0.2 for every 0.5 FTE, in this case $4 \times 0.2 = 0.8$). Given that the difference in the third period is only 1 FTE, the costs of equating these states is 0.4. In total, this amounts to transformation costs of $0 + 0.8 + 0.4 = 1.2$ points. If we then normalize these costs via the length of the shorter of the two compared sequences; $1.2 / 3 = 0.4$, we obtain the normalized costs of turning one sequence into the other, hence the distance of this pair of sequences.

Step 4: Perform a Cluster Analysis

In the concluding step, we cluster the founder, employee, and service provider dimensions of TFPs on the basis of their respective similarities. Consequently, all clusters obtained for each dimension encompass those processes that are particularly similar to each other, and distant to the processes of other clusters. Consequently, each cluster represents a distinct approach to founder, employee, or service provider involvement during TFPs.

(1) We use a combination of various partition quality measurements, namely the Weighted Average Silhouette Width (ASWw), R^2 , Point Biserial Correlation (PBC) and Hubert's C (HC) to determine the optimal clustering solution amongst solutions which contain between one and twenty clusters. These measures indicate how similar sequences are within one cluster and how different they are between clusters. Consequently, we calculated these indicators for one, two, three, etc., up to twenty clusters in order to determine their goodness of fit. In this way, we could determine for which cluster number the goodness of fit was maximized. In doing so, we also excluded cluster solutions which either did not yield distinct approaches because they clustered together too different sequences or spread out sequences over too many similar clusters.

(2) In the second step, we run correlation analyses in order to understand whether there are systematic relationships between the extents to which founders, internal labour (employees) and external labour (service providers) are involved in venture creation (*Propositions 2a - 2c*). We do so based on the likelihood of a venture ending up in a particular cluster pair across two channels. Since the expected cell count in the contingency tables is low (< 5) for a large number of cluster-combinations (56% of the cells), we use Fisher's exact test to examine the statistical significance of our results.

(3) In the third step, we use one-versus-rest logistic regression models to identify the conditions that influence the team formation approaches taken towards founder, employee, and service provider involvement (dependent variable) during the TFP. Testing *Propositions 3a - 5c*, we determine the explanatory power of labour market flexibility, the innovativeness, as well as the nature of the good developed by the new venture (independent variables), whereby we control for the venture's industry, year of registration, status as an independent or spin-off venture (control variables).

We fit the following model for each cluster to obtain the estimates:

$$\ln\left(\frac{p_i}{1-p_i}\right) = \beta_0 + \beta_1 LabourMarket_i + \beta_2 Innovativeness_i + \beta_3 NatureOfGoods_i + \boldsymbol{\beta}'\mathbf{x}_i \quad (1)$$

where p_i denotes the probability that venture i belongs to the cluster rather than to any of the other clusters, β_0 the cluster's intercept, β_1 , β_2 , and β_3 the estimated coefficients for our independent variables, $\boldsymbol{\beta}$ a vector of coefficients for the control variables, and \mathbf{x}_i a vector of control variables.

3.4 RESULTS

3.4.1 Patterns in team formation processes

The partition quality measurements identify the solution of 7 clusters (out of the overall 1-20 solutions considered) as optimal for different approaches of founder involvement in venture creation (ASWw = 0.46; $R^2 = 0.68$; PBC = 0.44; HC = 0.06). Given that any of these 7 clusters reveals a distinct approach to founder commitment to venture creation, we find support for *Proposition 1a*.

The 7 clusters we identify are fairly homogenous in size with two exceptions: The second founder cluster (F2) is the largest cluster, including 108 ventures. In turn, cluster F7 (Large founder team) is smallest ($n = 13$), while the remaining clusters contain between 37 and 54 ventures.

F1 is the third largest cluster ($n = 49$) and features ventures with a single part-time founder. Hence, for most of the TFP, founder involvement is 0.5 FTE in this cluster. While a minority of ventures goes through intermittent periods of inactivity or an increase to 1 founder FTE, this is a largely static approach. F2 (Full-time founder) and F3 (Small founder team) exhibit similarly static processes in which the founders invested 1 FTE, respectively 1.5 FTE for much of the process, with a few exceptions scaling up or down towards the end of the process. Ventures grouped together in F7 (Large founder team) don't display a clear transition pattern either but start out with larger founder team (3 FTE) than those in any other cluster.

The three other approaches taken to founder involvement are more dynamic. Accordingly, cluster F6 (Late and limited team growth), consists of ventures that start out with a mid-sized team of 2 or 2.5 FTE. Most ventures, especially those with longer TFPs, subsequently increase the founder involvement to up to 4 FTE. The sequences F4 (Early growth solo founder to founder team) and F5 (Early and constant team growth), are characterized by clear transition patterns. Accordingly, ventures in F4 begin the process with a founder involvement of 0.5 FTE and subsequently scale up to 1 or more founders around 9 months. Their counterparts in F5 begin at 1 FTE, before choosing to increase founder commitment after about 7 months, eventually settling on 2 to 3 FTE of founder involvement.

With regard to the clustering of the approaches taken towards employee hiring, the partition quality measurements indicate that a 6-cluster solution (out of the 1-20 cluster solutions considered) is best (ASWw = 0.64; $R^2 = 0.63$; PBC = 0.55; HC = 0.06). Given that each of these 6 clusters represents a distinct approach towards employee hiring throughout the venture creation process, we find empirical support for *Proposition 1b*.

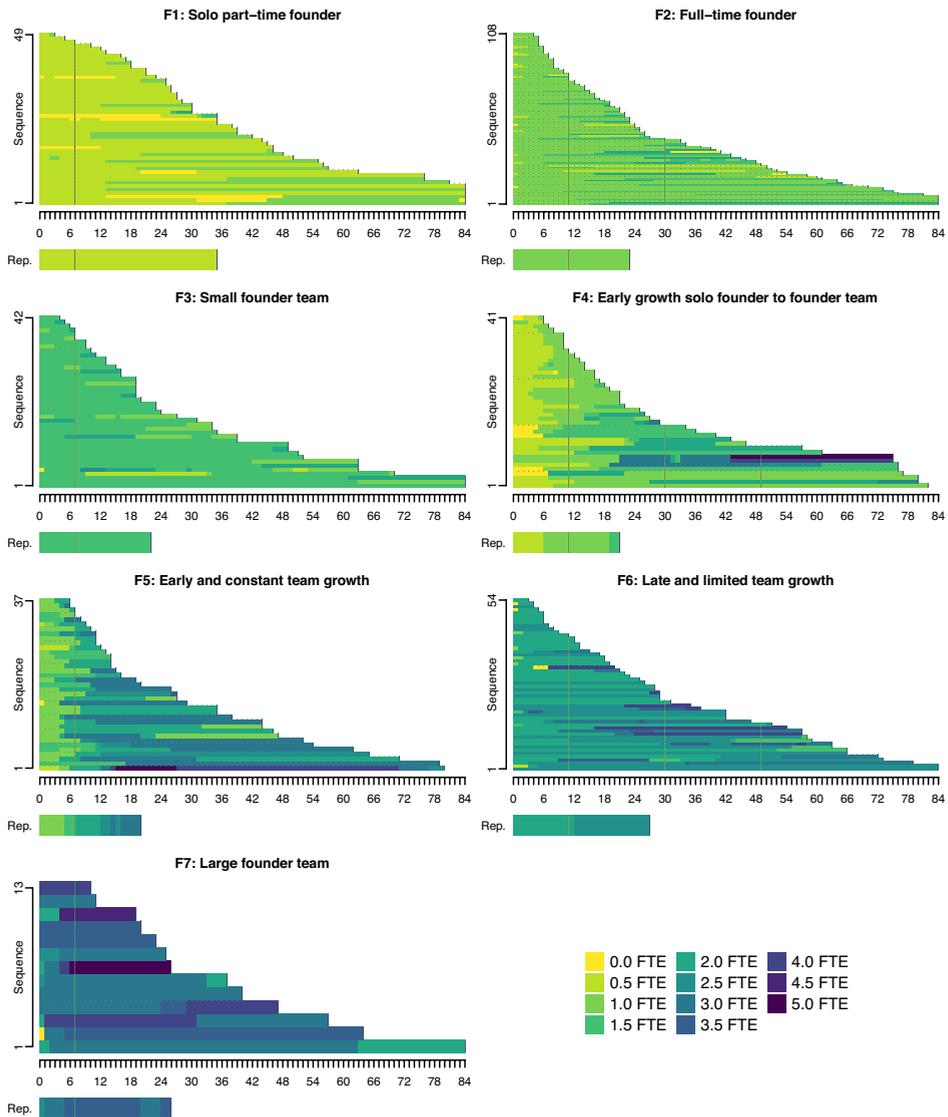


Figure 3.2 Distinct approaches to founder involvement

The distribution over the 6 approaches found for employee hiring is heavily skewed and less homogenous than that of the founder dimension. By far the largest group of ventures ($n = 226$) is found in employee cluster E1, a cluster characterized by the absence of employees. Compared to this passive and static approach to hiring employees, the rest of the clusters are more dynamic and are characterized by transition patterns and different levels of employee hiring. They range from 5 to 52 ventures in size.

E3 (Early and limited hiring) and E5 (Early and extensive hiring) both depict an approach in which the venture begins without an employee but then starts hiring within the first 6 months of the TFP. The major difference between these two approaches consists in the extent of hiring. Whereas ventures following the 'Early and extensive hiring' approach (E5) hire up to 5 FTE, their counterparts following the 'Early and limited hiring' approach (E3) transition from no employee to 1 or 2 FTE after 6 months. Similarly, dynamic transitions can be observed in E4 and E2. While the transition from no to 2-3 FTE in the 'Late and extensive hiring' approach (E4) happens after about 9 months, ventures following the 'Late and limited hiring' approach (E2) hire to a lesser extent (around 1 FTE) and do so mostly 12 months into the TFP or even later.

Furthermore, E2 and E3 both depict an approach in which ventures begin without an employee but eventually hire employees to the capacity of 1 FTE. The difference between these two approaches is the timing of the transition. In ventures pursuing the 'Early and limited hiring' approach (E3), this transition takes place within the first 6 months, while this typically takes more than 12 months for ventures following the 'Late and limited hiring' approach (E2). We observe a much stronger and more immediate employee involvement amongst ventures following the 'Immediate and extensive hiring' approach (E6). While only few ventures ($n = 5$) fall in this cluster, it is the most expansive approach as ventures start with 1-2 FTE employees and quickly expand to up to 5 FTE employees.

Regarding possible approaches taken towards engaging service providers, the partition quality measurements identify the 5-cluster solution (out of the overall 1-20 solutions considered) as optimal ($ASWw = 0.43$; $R^2 = 0.48$; $PBC = 0.57$; $HC = 0.08$). Given that these results indicate that five distinct approach towards engaging service providers exist, this lends empirical support for *Proposition 1c*.

The 5 clusters identified in the service provider dimension are similarly heterogeneous in size as those of the employee dimension. In parallel to the employee dimension, the largest cluster (SP1) is dominated by inactivity. With a size of 192 ventures it is more than 3 times as big as the second largest cluster SP2 ($n = 61$).

In contrast to SP1, SP2 (1 SP engagement) features ventures that typically involve 1 service provider. These ventures hire one service provider early on and sustain or repeat collaboration with this service provider for the remainder of TFP. Ventures in cluster SP4 (2 SP engagement) typically rely on 2 service providers. In most cases, these service providers were engaged immediately at the start of the TFP. While some ventures eventually hire more than 2 service providers, the cluster contains mostly static sequences. In SP3 (Early and moderate SP engagement) we find ventures that rely similarly heavily on external service providers, but mostly started hiring them after about 6 months into the TFP. The last cluster, SP5 (Immediate and

extensive SP engagement), is small, and is characterized by immediate and intense collaboration with external providers. However, this collaboration is very brief, either because the venture creation is quickly completed or because service providers are not retained for the remainder of the TFP.

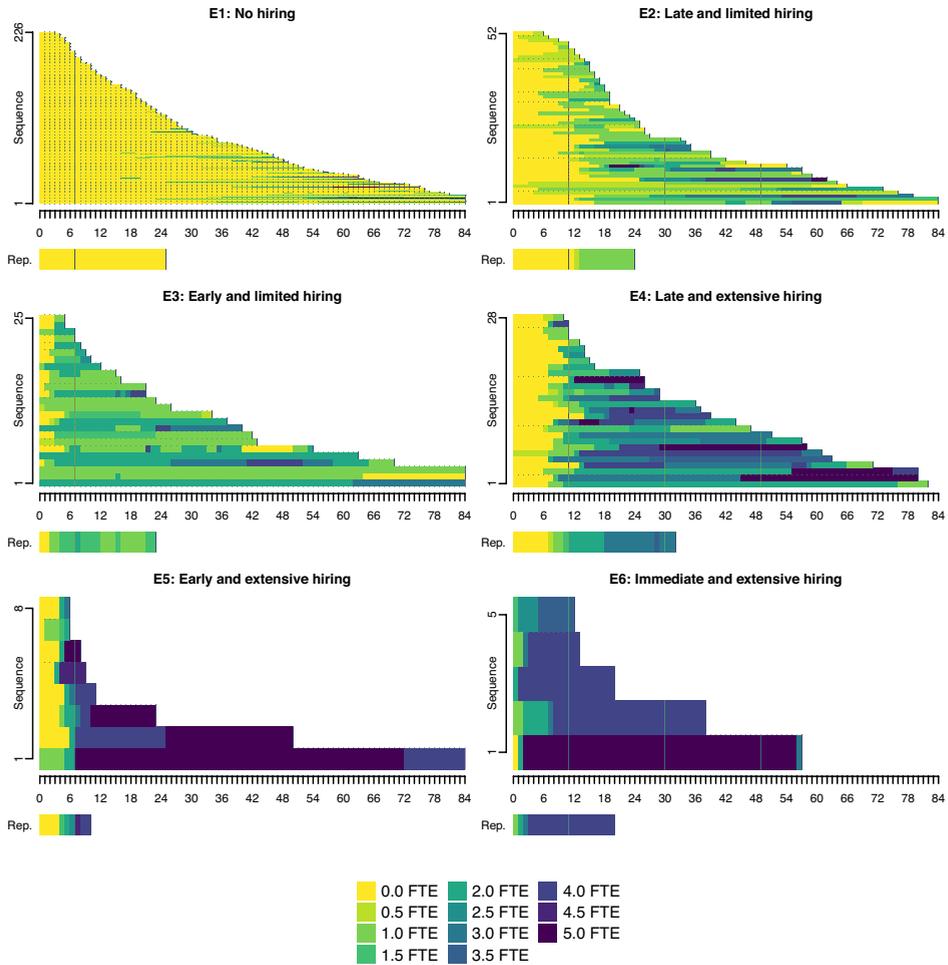


Figure 3.3 Distinct approaches to employee hiring

3.4.2 Correlations between Founder, Employee, and Service Provider Involvement

In line with *Proposition 2b*, Fisher’s exact test reveals that there is no significant correlation between the approaches taken towards founder and service provider involvement (Table 3.4). Overall, we also find support for *Propositions 2a and 2c* as we find statistically significant correlations between the approaches towards founder and employee involvement on the one

hand, and employee and service provider engagement on the other. However, the low Cramer's V values (.19 and .15 respectively) indicate that the observed correlations are comparatively weak. To better understand these correlations, we investigate the links between founder and employee involvement (Table 3.5) and employee and service provider engagement (Table 3.6) with the help of pair-wise cross-tabulations.

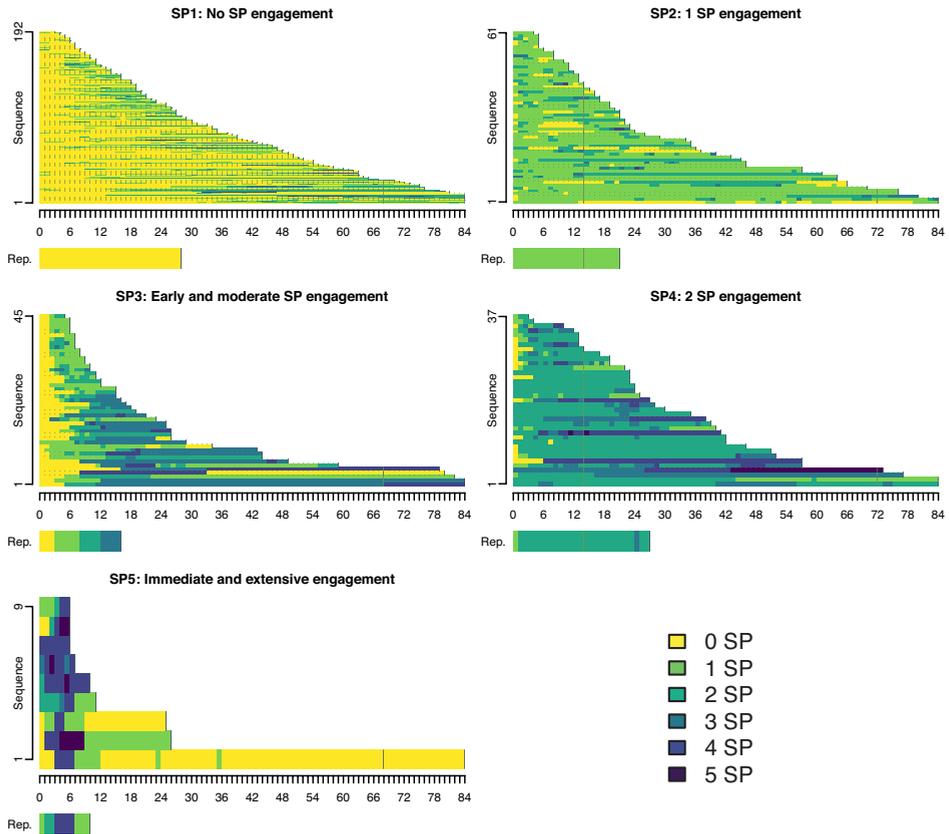


Figure 3.4 Distinct approaches to service provider engagement

Table 3.4 Correlation between TFP dimension

Dimensions	Fisher's Exact Test	Cramer's V
Founder x Employee	50,684***	.194
Founder x Service Provider	27,125	.137
Employee x Service Provider	26,685*	.149

p-values *** < .01, ** < .05, * < .1.

The cross-tabulations of the cluster pairs of the founder and employee dimension demonstrate that the observed correlations stem from a limited number of cluster pairs that co-occur particularly often (Table 3.5). In line with *Proposition 2a*, these reveal additive effects between the involvement of founders and the hiring of employees. Accordingly, E1 including ventures which never hire an employee frequently co-occur with part-time entrepreneurship throughout the venture creation process (F1). In contrast, ventures growing to larger founder teams over time (F5) are under-represented in said E1, indicating that founder teams committing substantial amounts of their own time are rare in ventures that abstain from hiring. The combination of F3 (Small founder team) and E2 (Late and limited hiring) co-occurs particularly often and is indicative of a slow growth process driven by a single full-time founder or a duo of two part-time founders. Another indication of additionality between founder involvement and employee hiring is that ventures in the two transition clusters F4 (Early growth solo founder to founder team) and F5 (Early and constant team growth) are associated with the transition cluster E4 (late and extensive hiring). We thus conclude that *Proposition 2a* is empirically supported.

With regard to employee hiring and service provider engagement, we find substitute effects (Table 3.6).

Table 3.5 Overlap between founder and employee clusters

Founder cluster	Employee cluster					
	E1	E2	E3	E4	E5	E6
F1	79.6%	18.4%	*	*	*	*
F2	65.7%	11.1%	13.9%	5.6%	*	*
F3	57.1%	26.2%	*	*	*	*
F4	68.3%	9.8%	*	14.6%	*	*
F5	51.4%	16.2%	*	21.6%	*	*
F6	70.4%	18.5%	*	*	*	*
F7	53.8%	*	*	*	*	*
Column total	65.7%	15.1%	7.3%	8.1%	2.3%	1.5%

* = < 5 expected observations. Values indicate percentage of the row cluster that is in the column cluster.

Accordingly, 'Late and limited hiring' approaches (E2) hardly co-occur with not hiring any service providers (SP1) but are more likely to co-occur with 'Early and moderate SP engagement' (SP3). Ventures hiring multiple employees at a comparatively late stage (E4) tend to make early and continuous use of one external service provider (SP2).

Table 3.6 Overlap between employee and service provider clusters

Employee cluster	Service provider cluster				
	SP1	SP2	SP3	SP4	SP5
E1	60.6%	15.9%	9.7%	11.1%	2.7%
E2	44.2%	21.2%	21.2%	11.5%	*
E3	56%	*	*	*	*
E4	50%	25%	*	*	*
E5	*	*	*	*	*
E6	*	20%	*	*	*
Column total	55.8%	17.7%	13.1%	10.8%	2.6%

* = < 5 expected observations. Values indicate percentage of the row cluster that is in the column cluster.

While the majority of combinations between employee hiring and service provider engagement seem to be independent of each other, we see that employee hiring and service provider engagement is substitute in those instances where they co-occur. This, in turn, lends empirical support to *Proposition 2c*.

3.4.3 Determinants of Approaches towards Founder, Employee, and Service Provider Involvement

Having found systematically different approaches to founder, employee, and service provider involvement in team formation, what are the drivers of each approach? In other words, under which conditions do founders contribute to venture creation in one rather than another way? While most of the founder approaches (namely clusters F6, F3, F2, and F4) do not differ as a function of the structural factors mentioned in the literature,² part-time entrepreneurship (F1) is more likely in product developing ventures, while it is less likely if ventures develop a radically and incrementally innovative business idea. Finding an association between ventures developing products and part-time entrepreneurship (F1; $\text{Exp } \beta = 1.895$; $p < .1$) might be surprising at first glance and contradicts the reasoning underlying *Proposition 4a*. Yet, when looking at the cases in founder cluster F1, part-time entrepreneurship can be explained by a high number of software engineers working on simple software products (apps), as well as farmers running alternative energy ventures in part-time next to their main business. Contrary to that, it is not surprising that innovative ventures are less often run by one part-time entrepreneur. As

2 Given that the R^2 s of these four clusters are low, factors other than the external ones included – such as process-related measures (e.g. whether, or not, the venture acquired external finance) – may be more relevant explanators. Yet, in answer to the claims of (Gartner and Shaver, 2012; Samuelsson and Davidsson, 2009) to study the impact of contextual factors on venture creation, we here focus on the aforementioned models.

suggested by *Proposition 5a*, imitative ventures do not require a high time commitment from their founders. The low coefficients for both degrees of innovativeness (0.341, respectively 0.293) associated with F1 clearly indicate the absence of innovative ventures amongst single part-time entrepreneurs.

The only other founder approach that is significantly associated with several structural factors is the transition process from 1 FTE to 2 or more FTE (F5). Founders pursuing this approach are much more likely to work for incrementally innovative, but not for radically innovative ventures (F5; Exp $\beta = 3.014$; $p < .1$), lending only partial support to *Proposition 5a*. Yet, in line with our reasoning of *Proposition 3a*, founders transitioning from low to higher time commitments are roughly three times more likely to be found in regulated rather than deregulated labour markets (F5; Exp $\beta = .352$; $p < .05$). Finally, founders in cluster F5 (early and constant team growth) are also more likely to be active in ICT rather than alternative energy industries.

Table 3.7 Regression estimates for founder clusters¹⁾

Variable	Founder cluster (Exp β)					
	F1	F2	F3	F4	F5	F6
Nature of Good	1.895*	.695	.91	.824	1.286	.914
Innovativeness Incremental	.341**	.964	.961	.984	3.014**	1.314
Innovativeness Radical	.293**	1.75	.736	1.5	1.447	1.199
Labour Market	1.518	1.223	.775	1.197	.352**	.996
Industry	.594	1.449	.95	1.579	.402*	1.393
Spin-off	.985	.931	1.003	1.175	1.117	.757
Crisis	1.441	.75	1.084	.894	.922	1.316
Intercept	.165***	.487***	.165***	.118***	.094***	.139***
Observations in Cluster	49	108	42	41	37	54
Total Observations	344	344	344	344	344	344
R ²	.073	.031	.005	.015	.128	.012

p-values *** < .01, ** < .05, * < .1.

1) Cluster F7 not included, because number of cases too limited for meaningful regression results

With regard to the drivers of the approach chosen towards employee hiring, it is first interesting, and rather unsurprising, to note that the hiring of no employees (E1) occurs less frequently in incrementally innovative ventures (E1; Exp $\beta = .646$, $p < .1$). This, in turn, lends support to the reasoning of *Proposition 5b*. Also, spin-offs are markedly less likely *not* to hire any employees (E1; Exp $\beta = .386$; $p < .05$), but twice as likely to hire at least one employee about twelve months after the start of venture creation (E2; Exp $\beta = 2.14$; $p < .1$).

Table 3.8 Regression estimates for employee clusters¹⁾

Variable	Employee cluster (Exp β)			
	E1	E2	E3	E4
Nature of Good	.881	.963	.482	2.222*
Innovativeness Incremental	.646*	1.506	1.107	1.371
Innovativeness Radical	1.160	.443	1.772	1.059
Labour Market	1.255	.698	1.156	.948
Industry	.698	2.517**	1.245	.520
Spin-off	.386**	2.14*	.412	1.428
Crisis	1.318	1.177	.394*	.854
Intercept	2.486***	.111***	.122***	.057***
Observations in Cluster	226	52	25	28
Total Observations	344	344	344	344
R ²	.063	.075	.057	.052

p-values *** < .01, ** < .05, * < .1.

1) Clusters E5 and E6 not included, because number of cases too limited for meaningful regression results

Furthermore, alternative energy ventures are significantly more likely to hire at least one employee twelve months after venture begin (E2; Exp β = 2.517; p < .05). This might be explained by the long time it takes to obtain all required permits, which implies that employees in alternative energy ventures are hired relatively late in the TFP.

As suggested by the reasoning underlying *Proposition 4b*, ventures developing products require more resources and need longer time to assemble these resources. The finding that product developers tend to hire rather 'late and extensive' (E4) thus supports *Proposition 4b* (E4; Exp β = 2.222; p < .1). Finally, we do not find any evidence in support of the idea, expressed in the reasoning of *Proposition 3b*, that regulated labour-market institutions hamper the hiring of employees.

Regarding the engagement of service providers, we observe several significant conditions in which ventures are particularly likely not to engage any service providers (SP1). We find twice as many German as American ventures not to hire service providers (SP1; Exp β = 2.081; p < .05). As outlined in, and in support of, the theoretical illustrations leading to *Proposition 3c*, rigid labour-market institutions are thus likely to stimulate the use of external service providers. Furthermore, we find that product developing ventures are more likely not to hire service providers (SP1; Exp β = 1.617; p < .05). Given the literature's argument that product developers invest and scale up more than service developers, this finding – together with the above finding

on employee hiring – can be interpreted to the extent that product developing ventures prefer the stability of hiring employees over the flexibility of engaging service providers. This supports *Proposition 4c* that the nature of the produced influences the approach to engaging service providers.

Interestingly, we observe the opposite associations with cluster SP3 (Early and moderate SP engagement), which means that ventures in rigid labour markets (SP3; Exp $\beta = .532$; $p < .1$) as well as ventures developing services (SP3; Exp $\beta = .495$; $p < .05$) are twice as likely as their respective counterparts to substantially hire service providers about 6 months into the TFP. This lends additional support to the reasoning underlying *Proposition 3c* and *Proposition 4c*.

No support is found for the reasoning underlying *Proposition 5c*, which suggests that the innovativeness of a venture's business influences the extent of service provider engagement. However, we find evidence that ICT ventures are likely to not hire any service providers (SP1; Exp $\beta = .553$; $p < .05$), but highly unlikely to intensely engage service provider (SP4; Exp $\beta = 2.964$; $p < .05$). We therefore conclude that, depending on their industry, ventures take significantly different approaches towards hiring service providers.

Table 3.9 Regression estimates for service provider clusters¹⁾

Variable	Service provider cluster (Exp β)			
	SP1	SP2	SP3	SP4
Nature of Good	1.617**	.892	.495**	1.166
Innovativeness Incremental	.823	1.113	1.312	1.134
Innovativeness Radical	.653	1.531	1.401	.952
Labour Market	2.081**	.662	.532*	.714
Industry	.553**	1.343	1.039	2.964**
Spin-off	.952	.795	1.133	1.300
Crisis	1.375	.860	.659	.940
Intercept	.893	.24***	.255***	.078***
Observations in Cluster	192	61	45	37
Total Observations	344	344	344	344
R ²	.073	.018	.04	.064

p-values *** < .01, ** < .05, * < .1.

1) Cluster SP5 not included, because number of cases too limited for meaningful regression results

3.5 DISCUSSION AND CONCLUSIONS

What have we learned about possible approaches to team formation during venture creation and their drivers? Most importantly, our analyses lend support to the underlying assumption of both the stage-based (Levie and Lichtenstein, 2010) and the activity-based literatures (Gartner and Shaver, 2012; Liao et al., 2005) that team formation processes are ‘order, not chaos’. Yet, in contrast to the stage-based literature, we did not find one best way of organizing team formation during venture creation. Instead, we identified seven distinct ways in which founders contribute to venture creation (ranging from part-time entrepreneurship to strongly growing founder teams), six different approaches towards hiring employees (ranging from no hiring to the immediate hiring of numerous employees), and five distinct ways of engaging service providers (also ranging from the engagement of no service providers to a high number thereof). Most importantly, these approaches differ from each other in the extent to which they are static or, respectively, dynamic: Whilst static approaches are characterized by a stable number of founders, employees, or service providers contributing to venture creation, their number varies throughout the venture creation process in dynamic clusters – whereby it is interesting to note that, with one exception, all dynamic approaches are characterized by an increase, rather than a decrease, in team size.

Interestingly, the approaches taken towards founder, employee, and service provider involvement during venture creation, partly correlate with each other. In other words, the extent to which founders engage in venture creation on the one hand, and hire employees and service providers on the other, is partly correlated. With regard to founder and employee involvement, we observed additionality effects as previously described in the literature (Cooper et al., 1989; Reynolds and White, 1997), meaning that founders who only engage part-time in venture creation often also abstain from hiring any employees. Similarly, ventures whose founder team grow slowly over the venture creation process also slowly increase their employee base by about 1 employee over time. The same holds for high-growth ventures that are characterized by both substantially growing founder and employee teams. Interestingly, such additionality effects could only be observed for internal labour resources, i.e. between founder and employee involvement. Systematic correlations between founder and service provider approaches could not be observed. Finally, and in line with (Román et al., 2011), we found some substitution effects in the extents to which employees and service providers are engaged in venture creation as ventures tend to rely on service providers in those moments where hardly any employees are hired, and vice-versa.

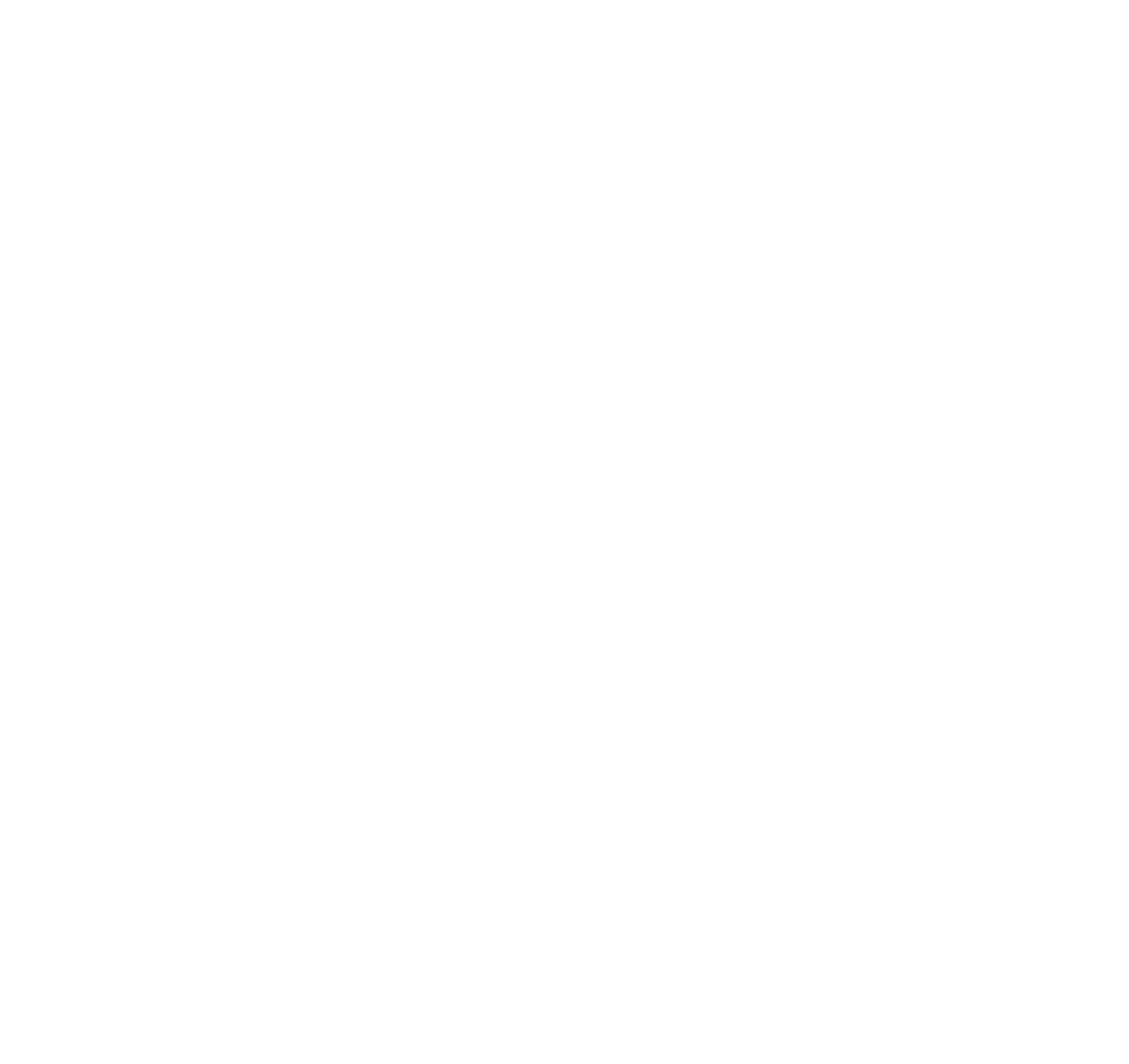
Finally, we showed that several structural conditions influence which approach is taken towards founder involvement, employee hiring and service provider engagement. Accordingly, we saw that the nature of the good developed (product or service) often influences team formation approaches, while labour-market institutions and the innovativeness of a venture’s business idea

partly impacts on team formation processes: Contrary to service developers, product developing ventures are characterized by part-time founders, the late but intense hiring of employees, and the early and intense hiring of service providers (see Audretsch et al. (2004), Fritsch and Weyh (2006)). Furthermore, the team formation processes of incrementally innovative ventures are hardly characterized by part-time founders but rather by slowly increasing founder teams and the systematic hiring of employees. Finally, rigid labour-market institutions imply that ventures grow their founder team rather slowly, do not impact the approach taken towards employees hiring, but make that ventures substantially rely on external service providers to get the work done. Overall, and in line with the VoC literature (Hall and Soskice, 2001), our results thus suggest that institutional labour-market rigidity leads to small-scale growth.

Furthermore, our paper also offers important methodological contributions. By applying optimal matching techniques to analyse venture creation processes, we illustrate how this novel methodological approach can be used in business and management research. Our research thus offers a methodological answer to the long-standing call for systematic insights into how venture creation processes unfold over time (Moroz and Hindle, 2012; Ruef, 2005; Van de Ven and Engleman, 2004). In addition, we developed a new way to determine the distances between sequences of highly different lengths, a problem that is frequently occurring in social processes (Aisenbrey and Fasang, 2010). We hope that our methodological advancements can contribute to, a much needed, better understanding of longitudinal data in the context of venture creation.

Like virtually all research, our study has its limitations, which pave the way for future research. To better assess the impact of different labour-market institutions, a broader database including data for more than two countries would be highly useful. Besides broadening the existing database, future research should also focus on other drivers of team formation than the ones we considered. This is particularly true as the low R^2 -values of our regression analyses indicate that other factors than the ones included exist that have a significant influence on a venture's team formation approach. These factors might also include internal and time-dependent characteristics of ventures, such as the funding acquisition process of a venture. Finally, future studies would also provide novel and highly appreciated insights if they could link team formation processes to specific outcomes, such as venture success.

With our exploration of team formation processes, we have investigated a part of venture creation that has mostly been a black box in the past. While previous research has chiefly studied the link between venture characteristics and the outcomes of venture creation, namely growth and success, we here provide a detailed account of how team formation plays out between the starting and end point of venture creation. By uncovering that distinct team formation processes exist, and what they look like, we have been able to discern differences in venture creation that have, to date, been largely ignored.



CHAPTER 4

Follow the Money: The Funding Acquisition Process of Nascent Ventures

This chapter is based on: L. Held, A.M. Herrmann, F. Polzin: Follow the Money: The Funding Acquisition Process of Nascent Ventures. Re-Submitted to *Journal of Business Venturing*.

ABSTRACT

This paper integrates the largely separate literatures of financial bootstrapping and pecking-order theory (POT) in order to explore how funding acquisition processes, evolve at the firm level. Based on novel optimal matching techniques combined with binary logistic regressions, we identify how the most typical funding acquisition processes of nascent ventures evolve in specific circumstances. In accordance with financial bootstrapping theory, the majority of nascent ventures rely on bootstrapped finance. Importantly, we are additionally able to theorize – in line with pecking order theory – under which circumstances the minority of nascent ventures transition from founder and insider equity towards market-based (debt and equity) finance. As a result, we offer a novel theoretical approach to understand how funding acquisition processes evolve in nascent venture.

4.1 INTRODUCTION

The public discussion about stimulating entrepreneurship and innovation, especially in Europe, is often dominated by the difficulties of nascent ventures to access funding (Bertoni et al., 2016; Nightingale et al., 2009). The defining characteristic of nascent ventures in relation to acquiring different types of funding is their liability of newness and often smallness (Parker, 2009; Sine et al., 2006; Stinchcombe, 1965). These traits generally manifest themselves in information opacity, a lack of a track-record and tangible assets (Aldrich and Fiol, 1994; Cressy, 2002) as well as limited legitimacy and the informality of the nascent organisation (Liao et al., 2008). Yet the nascent stage is crucial for venture development (Brush et al., 2002; Davidsson and Honig, 2003). In order to understand how ventures come into being, 'survive' the formation phase and succeed, it is thus crucial to understand how they go about accessing finance (Townsend and Busenitz, 2015).

Two different literature strands, which have largely developed independently of each other, allow deriving propositions of how nascent ventures go about funding acquisition, namely (1) the financial bootstrapping approach of resource acquisition and (2) the pecking-order-theory (POT).

(1) The idea of bootstrapping goes back to the idea of the resource dependency theory (Brush et al., 2008a). Given that nascent ventures are often scarcely endowed with (financial, human and organizational) resources, the founders of nascent ventures typically need to acquire funding in order to meet their needs for additional resources (Brush et al., 2002; Lam, 2010). But due to uncertainty, information asymmetries and prohibitively high financing and transaction costs, nascent ventures can be expected to revert to bootstrapping, that is the 'use of methods to meet the need for resources, without relying on long-term external finance' (Winborg and Landström, 2001, p. 238). This includes delaying payments, sharing resources, minimizing accounts and stocks, as well as resorting to owner finance (financial bootstrapping) (Van Auken, 2005). The financial bootstrapping approach thus provides an alternative explanation to financial economics of how nascent ventures approach the finance acquisition process (Ebben and Johnson, 2006; Ebben, 2009), an approach which revolves around internal sources of finance, namely founder and insider equity (Harrison et al., 2004).

(2) Relying on principal-agent theory and signalling mechanisms between financiers (principals) and ventures (agents), POT on the other hand depicts a preference order of funding sources and capital structure over the course of venture development and growth (Berger and Udell, 1998; Cumming, 2005a; Robb and Robinson, 2014; Sapienza et al., 2003; Sogorb-Mira, 2005). The stylized order starts with founder's own equity, followed by insider equity (family, friends and other personal relationships), for which information asymmetries and moral hazard concerns

are typically low, also limiting costs of finance. Once these sources are exhausted, entrepreneurs are expected to turn to institutional debt-providers, such as banks. If debt acquisition fails, external equity is thought to be acquired last, because it is the costliest form of finance and typically requires giving up control rights over the venture.

Given that both the financial bootstrapping theory as well as POT allow to derive clear-cut propositions about how nascent ventures build a financial resource base, it is striking that the entrepreneurial and small business finance scholars have, thus far, rarely integrated the two literatures and assessed how nascent ventures acquire funding over time (exceptions are Cosh et al., 2009; Jonsson and Lindbergh, 2013).

Furthermore, the POT literature struggles to empirically confirm the predominance of the depicted linear funding acquisition process (Cumming, 2005a; Frank and Goyal, 2003; Robb and Robinson, 2014). This struggle is chiefly ascribed to a methodological problem, namely that static data is used to assess propositions about a dynamic process: Scholars typically use balance sheet data or (panel) survey data, such as the PSED, to link the type and amount of funding to outcomes of the venture creation process, such as venture success or size. Most studies rely on year-by-year data and, thus, a rather static measure for a process that can drastically change within weeks or months (Cassar, 2004; Gartner et al., 2012).

Consequently process-oriented evidence of the funding acquisition of nascent ventures is limited (Audretsch et al., 2012; Cassar, 2004; Hechavarría et al., 2016). As a result, little is known about the sequence(s) in which ventures acquire specific types of funding (Cumming and Groh, 2018; Cumming and Johan, 2017; Gartner, 1985; Gartner et al., 2012; Gompers and Lerner, 1998). Hence it remains unclear to what extent the theoretical propositions of the POT and financial bootstrapping theory are applicable. As a result, policy-makers as well as practitioners lack a dynamic understanding of when the best moments are to offer (distinct types of) financial support to nascent ventures.

Yet, entrepreneurship research in general (Hjorth et al., 2015; McMullen and Dimov, 2013; Ruef, 2005; Ucbasaran et al., 2001), and the entrepreneurial finance literature in particular (Cassar, 2004; Cumming and Groh, 2018; Cumming and Johan, 2017; Harrison et al., 2004), repeatedly call for studies that explore processes including the intersection between different sources of finance with the help of large longitudinal datasets. As (Cassar, 2004, p. 279) notes: *“The ideal sample (...) consists of entrepreneurs in the process of starting a venture and tracking these entrepreneurs through the initial stages of business formation”*. It takes an event, rather than an outcome driven research approach to thoroughly understand organizational developments that unfold over time, such as the funding acquisition process (Aldrich, 2001; Harrison et al., 2004). To address these research gaps in the entrepreneurial finance literature, we ask here: *Do nascent*

ventures pursue different approaches to funding acquisition and, if so, how do these processes look like, and which circumstances explain that ventures choose to pursue one rather than another finance acquisition process?

To answer this research question, we explore the funding acquisition processes of early-stage ventures based on a unique and novel dataset of 762 nascent ventures in Europe (UK, Germany, Italy, The Netherlands) and the US across the ICT and Renewable Energy (RE) industries – two crucial sectors for the transition towards a sustainable economy. We base our exploratory analyses of funding acquisition processes on sequence analyses using optimal matching techniques. This novel methodology (which was originally used in the natural sciences to decode the human genome) offers fine-grained, over-time insights into finance acquisition processes by comparing entire processes rather than individual data points over time. Sequence analyses thus offer truly dynamic insights into how processes unfold over time, rather than to dissect processes into probabilities of events at specific moments in time. This, in turn, makes it possible to identify the most frequently pursued finance acquisition processes and to illustrate how these evolve over time. In addition, we use binary logistic regressions to identify the circumstances in which nascent ventures choose to pursue one rather than another finance acquisition process.

The contributions of our paper are thus two-fold: First, we illustrate to what extent POT and bootstrapping theories, which have thus far developed independently of each other (except for Cosh et al., 2009; Jonsson and Lindbergh, 2013), can explain how funding acquisition processes evolve with regard to the sequence of funding options chosen. We find that bootstrapping theories based on the resource-dependency view can better explain why the majority of nascent ventures chiefly relies on their founders' equity throughout the venture creation process. In addition, we observe that a more limited number of ventures follows a transitory process from founder-equity based funding to other funding sources, especially external (debt and equity) finance. In line with the expectations of the POT literature, ventures developing tangible products are more likely to transition from founder equity to debt-funding. Innovative ventures, in turn, tend to combine founder equity with grant acquisitions at an early stage, or to fund their endeavours through external equity altogether. Finally, ventures that hire employees are particularly likely to transition to debt finance or to use external equity next to their founders' funds. Our paper is thus amongst the first to illustrate how financial bootstrapping theory and POT relate to each other.

Second, and as a corollary of this theoretical contribution, our findings pave the way for a new methodological approach to venture creation research. Sequence analysis allows for differentiating a large number of venture creation processes based on monthly activities. The identification of patterns makes it possible to understand what steps entrepreneurs take in setting up their venture, i.e. how they transition between different funding sources. This

methodological contribution answers long standing calls in entrepreneurship research for dynamic analyses of venture creation processes (Dimov, 2018; Hjorth et al., 2015; McMullen and Dimov, 2013; Van de Ven and Engleman, 2004).

The remainder of this paper is structured as follows: Section 2 develops the bootstrapping and POT arguments which allow us to formulate exploratory propositions and hypotheses about how nascent ventures approach the funding acquisition process. To assess these claims, section 3 illustrates our empirical approach and explains how we operationalise the respective indicators. Section 4 comprehensively describes our descriptive and statistical results which we link back to POT and bootstrapping theories in section 5.

4.2 THEORY

4.2.1 Funding options of nascent ventures

A large variety of ways exists to categorize different venture funding options. They range from broad categorization of private (bootstrapped) and institutional (market/external) finance (Gartner et al., 2012), over intermediate ones that in addition distinguish between external equity and debt (Frid, 2009), to the more detailed one introduced by Robb and Robinson (2014). The latter systematically characterize funding options along two dimensions: namely their source and type. The source indicates which type of actor provides funding to the venture, including founders and insiders (spouses and parents) as well as outsiders/ market actors (banks, other businesses, government agencies, and venture capitalists). The type, in turn, indicates whether funding is provided in exchange for shares (equity) or has to be repaid with (or without) interest (debt).

In this article, we largely follow this categorization by Robb and Robinson (2014), whereby we distinguish between different finance sources only with regard to equity in order to increase comparability to existing studies of the broader entrepreneurial finance literature and explicitly including bootstrapping (Bhide, 1992; Cumming, 2005a; Ebben and Johnson, 2006). For the same reason, we also account for a third type of funding, namely grants, which are provided as a subsidy (Ebben and Johnson, 2006; Van Auken, 2005). Accordingly, we here account for founder equity, insider equity and external equity, as well as debt finance and grants as the major funding options of new ventures (see Table 4.1).

Table 4.1 Categorization of Funding (Source: Own overview based on Robb and Robinson (2014))

Type	Source	Theoretical origin
Equity	Founder	Bootstrapping/POT
	Insider	Bootstrapping/POT
	External	POT
Debt	External	POT
Grant	External	Bootstrapping

4.2.2 Financial Bootstrapping

Limited legitimacy as well as liability of newness and smallness constrain the bargaining power of nascent firms, resulting in disadvantageous resource dependencies (Ebben and Johnson, 2006; Packalen, 2007; Pfeffer and Salancik, 1978; Stinchcombe, 1965). Given this unfavourable situation for competing on external resource markets, nascent firms must attract, develop, and utilize their (financial) resource base in an informal way (Bhide, 1992; Brush et al., 2002; Lam, 2010).

Winborg and Landström (2001) analyse different patterns in the bootstrapping behaviour of entrepreneurs. They broadly find that the use of personal resources (through lower salary, credit etc.), the use of timing in payment, sharing or renting equipment and premises, as well as the use of start-up subsidies constitute major financial sources. They also show that privately-owned, insider-financed ventures are often characterized by an immature business with low profits margins and a need for additional finance. Building on this seminal study, Van Auken (2005) analyses the influence of firm characteristics on bootstrapping behaviour by comparing technology-based and non-technology based firms. He finds that the owners of technology-based firms deem bootstrapping methods which improve cash inflows more important. Regarding environmental conditions for bootstrapping, Grichnik et al. (2014) show that nascent ventures engage more in bootstrapping activities not only in environments perceived as hostile, but also when the entrepreneurs have higher levels of social and human capital.

Taking a more dynamic perspective, Ebben and colleagues (Ebben and Johnson, 2006; Ebben, 2009) examine what type of bootstrapping methods entrepreneurs use over time. Interestingly, they find that owner-related finance is especially important in the early stages of a venture's lifecycle which, in turn, is in line with the resource-dependency argument (Ebben and Johnson, 2006). Similar findings are obtained by Harrison et al. (2004) who study the role and importance of bootstrapping in product development and business development in the independently-owned software industry.

Finally, Winborg (2009) investigates whether founders use (financial) bootstrapping as a first or last resort. He finds that 'lower costs' and a 'lack of capital' constitute the two most important reasons for financial bootstrapping, which indicates that bootstrapping is a deliberate choice. Scholars investigating the impact of (financial) bootstrapping techniques on subsequent venture development (Vanacker et al., 2011) demonstrate that several bootstrapping strategies (especially the use of own funds in combination with the own time) are positively associated with the growth of new ventures.

In sum studies demonstrate that the majority of nascent ventures use (financial) bootstrapping i.e. they only rely on their own and insider equity in order to mitigate dependencies on external financial resources. Hence, we expect to find that

Proposition 1a: Until they reach profitability, the majority of nascent ventures exclusively rely on the founder's own resources to finance their business.

4.2.3 Pecking-Order Theory (POT)

POT offers an alternative view of how funding acquisition processes evolve in nascent ventures: POT focuses on how the limited resource endowment of nascent ventures results in a situation

of asymmetric information between the venture founder and his potential financier (Lee et al., 2015; Mina et al., 2013; Stiglitz and Weiss, 1981), where conveying credible information to potential funders is often either prohibitively expensive or not possible (Berger and Udell, 1998). Asymmetric distribution of information gives rise to a number of agency problems (Cumming et al., 2015; Eisenhardt, 1989). As this paper is about funding acquisition, we focus on adverse selection (Jensen and Meckling, 1976) which describes a situation in which the agent's (entrepreneur's) signals about the quality of the venture cannot be observed or verified by a prospective principal (the funder) (Cumming, 2005b; Eisenhardt, 1989). Depending on the signals used by the agent, the principal's decision-making process is thus flawed, so that the wrong investment option (venture) is selected.

Founders of ventures are thus faced with the challenge of overcoming adverse problems in order to secure the required funding, while they also need to optimize the cost of capital and to retain control over their venture (Hechavarría et al., 2016; Myers and Majluf, 1984). POT proposes that agency problems entail a distinct order of attractiveness and, thus, accessibility of different funding types and sources. This, in turn, leads to a linear process in which ventures try to acquire these different funding options. The assumed order of preference expects ventures to first exhaust (1) founder and (2) insider equity (financial bootstrapping). Once these funding options are no longer viable, ventures approach (3) debt providers and only in a last step (4) external equity providers such as venture capitalists (Berger and Udell, 1998; de Bettignies and Brander, 2007; Michaelas et al., 1999; Myers and Majluf, 1984).

A venture funded by its founders has by definition no agency problems (adverse selection or moral hazard), because ownership and control are in the hands of the same person(s), making it cheap and easy to access this funding source (Cosh et al., 2009; Hechavarría et al., 2016; Norton, 1991). While this does not hold for funding through insider equity (Ang, 1992), information asymmetries between insider equity providers and the venture are less pronounced because of the equity providers' personal relationships to the founders and, thus, their social control and informal access to venture information (Cable and Shane, 1997; Cornelissen and Clarke, 2010; Shane and Cable, 2002). Accordingly, debt and external equity providers suffer most from adverse selection problems as they have no social network ties to overcome asymmetric information. These agency problems induce debt and external equity providers to ask for a premium to fund new ventures (Akerlof, 1970). This, in turn, makes external funding more expensive and thus less attractive for ventures vis-a-vis founder and insider funding (Cumming, 2005a; Vanacker and Manigart, 2010). Taking the pecking order theory as a reference point, we alternatively expect to find that

Proposition 1b: Until they reach profitability, the majority of nascent ventures start with the founder's own resources, followed by the acquisition of insider funding and (institutional or market-based) funding.

4.2.4 Determinants for nascent ventures' going beyond financial bootstrapping

After establishing that financial bootstrapping and POT theory have rather opposing views on how the majority of nascent ventures proceeds to finance their business, they jointly propose complementary arguments about the specific circumstances under which some ventures turn to external funding: Nascent ventures need to go beyond financial bootstrapping whenever they need to finance larger endeavours, most importantly (1) the hiring of employees, (2) the development of innovative business ideas, and (3) the development of tangible products (Cosh et al., 2009; Mina et al., 2013; Plummer et al., 2016). While the financial bootstrapping literature remains largely silent on how the need to finance these endeavours leads nascent ventures to transition from founder-equity to external funding, the POT literature enables us to derive arguments about such financial transition processes:

(1) Ventures with employees: Ventures that do not hire employees tend to have rather limited growth ambitions (Gartner et al., 2012; Storey, 1994), which reflects the general level of resource availability (Grichnik et al., 2014). These ventures do therefore typically not require as much funding and, as a result, are more likely to satisfy their funding needs through finance provided by the founders themselves (Avery et al., 1998). Accordingly, Vanacker et al. (2011) find that that owner-financed ventures hire more interim personnel. Nascent ventures that do not hire any employees are restricted to founder funding, both by the lack of supply and demand for external funding (Cosh et al., 2009).

The hiring of employees, by contrast, signals a venture's growth commitment to external funders and can thus help to mitigate the liability of newness problem (Busenitz et al., 2005). We therefore expect that ventures, having hired at least one employee when setting out for funding acquisition, make use of external funding sources once the founder resources are exhausted:

H2: Nascent ventures having hired at least one employee are more likely to acquire external funding after acquiring founder equity.

(2) Innovative ventures: The investment amounts required for research and development (R&D) typically exceed the resources of the venture founders by far. This forces the latter from the outset to acquire funding from external funders (Mina et al., 2013), who often contribute not only funding but also knowledge/advice about product development and access to their networks (Barney et al., 1996; Drover et al., 2017; Hsu, 2006; Sorensen, 2007). Furthermore, research and development (R&D) of novel products is generally a highly uncertain process which implies a high likelihood of failure (Audretsch et al., 2012). Innovative ventures cannot access debt, because signals of innovation (such as patents) do not qualify as collateral or guarantee for a stable cash-flow in the future (Lee et al., 2015). According to POT, this makes institutional/market investors (venture capitalists and business angels) the primary funding source for

innovative nascent ventures (Drover et al., 2017; Dutta and Folta, 2016; Vanacker and Manigart, 2010). In addition, innovative firms can rely on government grants as one of their major financial sources (Burns et al., 2016; Vanacker et al., 2011; Winborg and Landström, 2001).

Venture capitalists and business angels are particularly likely to offer finance as innovation activities signal growth expectations (Davila et al., 2003; Gorman and Sahlman, 1989). Audretsch et al. (2012) highlight that patents as codified innovation acts as a signal to attract external finance. In recent studies, Howell (2017) and Islam et al. (2018) found that being awarded a prestigious research grant also increases the likelihood of subsequently acquiring venture capital.

In line with POT which sees grants as a predictor for innovation, we thus expect innovative ventures to not tap into insider capital sources but to directly approach institutional investors or grant providers:

H3: Innovative ventures are more likely to acquire external equity or grants after the investment of founder equity.

(3) Ventures developing tangible products: Product developing ventures are more likely to pursue economies of scale and thus require larger investments compared to ventures that are 'asset-light' service providers (Bertoni et al., 2016; Migendt et al., 2017; Winton and Yerramilli, 2008). Consequently, the funding needs of product developers are likely to exceed their founders' resources, which leads them to seek external financing options (Grichnik et al., 2014; Mina et al., 2013; Winton and Yerramilli, 2008).

Ventures that seek to invest funds into tangible assets or products have a larger chance to use these assets as collateral in the funding acquisition process (Robb and Robinson, 2014). This, in turn, is attractive for banks as they might be able to (partly) recover their investments in case of venture failure (Lee et al., 2015). A venture producing tangible products can more easily overcome the liability of newness by also signalling future cash-flows based on the sales of these products, which constitutes a major decision criterion for obtaining external bank finance (Berger and Udell, 1998, 2006; Cosh et al., 2009).

Taken together, ventures producing tangible products are thus more likely to seek and gain access to debt finance after the investment of founder equity:

H4: Nascent ventures that produce tangible products are more likely to acquire debt after the investment of founder equity.

4.3 METHODOLOGY

4.3.1 The Data: Sample and operationalization

To explore the propositions and to test the aforementioned hypotheses, we use a unique firm-level dataset entitled “Perfect Timing Database”. Based on computer-assisted telephone interviews with founders, we collected this dataset between 2011 and 2018 by an international research team located in Utrecht (The Netherlands), New York (US), Germany (Düsseldorf and Cologne), London (UK), and Palermo (Italy)¹. In order to capture possible variations in venture creation processes, the population interviewed includes ventures of all legal forms (excluding sole proprietorship) that were registered between 2004 and 2014 in the information technology (IT) and renewable energy (RE) industries in Germany, Italy, the US, The Netherlands and the UK. From this population, founders were randomly selected and invited to participate in an interview about the venture creation process of their company until a sample of 762 cases had been obtained.

We collected the data with an explicit focus on the timing and sequencing of venture creation activities, which also allows us to discern patterns in funding acquisition processes (dependent variable) on a monthly basis. Importantly, the dataset is restricted to the duration of the initial phase of the venture creation process. This process begins with the first time a founder talked with someone else about setting up the venture in question; it ends at the moment when the venture generated sustainable profits (defined as 3 consecutive profitable months). If a new venture never made sustainable profits, three alternative process ends can occur: namely the acquisition, merger or liquidation of the respective venture. If none of these events occurred until the date of the interview, the process of venture creation was categorized as ongoing and recorded up to a maximum duration of 84 months. 669 ventures (87.79%) reached sustainable profits successfully. 31 (4.08%) were acquired, merged or closed down. For 62 companies, the venture creation process was still ongoing at the time of the interview.

Dependent variable: The funding acquisition process

For the purpose of this analysis, we only consider that part of the venture creation process which is relevant for a ventures funding. Accordingly, we consider the first time the venture starts acquiring any type of finance as the starting point of the funding acquisition process; its end date corresponds to the end date of the overall venture creation process as described above. Throughout this process, we report the funding acquisition activities undertaken on a monthly basis. Thereby, each funding activity is recorded, starting with the month in which the venture approached a funder and ending with the moment in which the venture actually

1 Minimum 1.25 and maximum 28.08 years elapsed between start of funding acquisition process and interview; the mean is 8.53 years.

received funding. This definition of funding acquisition ensures the comparability across cases. Accordingly, we only record funding acquisition activities that were successful, thus led to the actual acquisition of funding. Failed attempts to acquire funding are not recorded. Furthermore, months during which a venture was not actively acquiring any type of funding are ignored for the purpose of the analysis. While this approach reduces the explanatory power of our analysis with regard to differences in the length of funding activities, it allows us to gear the analysis towards exploring the sequence of funding acquisition activities. Given that the latter is at the basis of pecking-order theory, this approach is most appropriate for the theoretical aim of our paper to shed light on the POT arguments.

In order to create a typology of funding acquisition processes, we determine the state of funding acquisition for each month of venture creation. The respective state of funding acquisition represents the funding types and sources acquired for each month. In line with the literature, we distinguish between equity, debt and grant as types of funding. We furthermore follow the literature by determining from which source equity was acquired. As a result, we distinguish between five different states, representing five combinations of different funding types and sources, namely Founder Equity, Insider Equity, External Equity as well as Debt and Grants. Of course, a venture can simultaneously acquire funding from more than one source and of more than one type. Consequently, these five type/source combinations can co-occur during the funding acquisition process. In order to keep the number of possible states manageable and comparable to previous work (Gartner et al., 2012; Robb and Robinson, 2014) we consider eight, individual and aggregate states (listed in Table 4.2) at which we arrive in the following two-step approach.

In the first step (1), we reduce the number of states whenever a venture is simultaneously acquiring multiple types of equity. In these cases, we give preference to that type of equity which, according to POT theory, is most difficult to acquire. The POT order considers external equity as most difficult and founder equity as the least difficult to acquire.

In a second step (2), we code all states in which grant acquisition co-occurred with any other type of funding acquisition as a 'grant-only' state. This coding approach is based on the assumption that acquiring grants is such a unique and time-intense activity that it is basically irrelevant if and what other type of funding is acquired simultaneously.

We illustrate these two aggregation steps by the hypothetical funding acquisition process exemplified in Table 4.3: For the first two months, the hypothetical venture is exclusively financed through the equity of its founder. In month 3, the venture starts acquiring equity from an insider (i.e. family member or friend). Consequently, and as described in step (1) above, we aggregate the simultaneous acquisition of founder and insider equity to the state 'acquiring insider equity' (IE).

Table 4.2 Coding the Funding Source/Type states

		Funding Type			
		Equity	Debt	Debt & Equity	Grant
Equity Source	Founder	FE	D	D&FE	G
	Insider (& Founder)	IE		D&IE	
	External (& Founder, Insider)	EE		D&EE	

The same happens in month 5, when the venture acquires all three equity types simultaneously. Again, in accordance with aggregation step (1), we code this state as ‘acquiring external equity’ (EE) as the latter is the most difficult equity source to acquire. In month 6, the venture starts acquiring debt finance in parallel to founder equity and external equity which is coded as ‘debt and external equity acquisition’ (D&EE). Finally, and in accordance with step (2), we aggregate the simultaneous acquisition of debt and grant in month 9 to the state ‘grant acquisition’ (G).

The row “Funding State” aggregates the funding acquisition activities for every month as outlined above, thereby reporting the entire funding acquisition process of our hypothetical venture.

Table 4.3 Example of a Funding acquisition process

Source	Type	Month									
		1	2	3	4	5	6	7	8	9	10
Equity	Founder	FE	FE	FE	FE	FE	FE	FE			
	Insider			IE	IE	IE					
	External					EE	EE				
Debt							D	D	D	D	0
Grant										G	G
Funding State		FE	FE	IE	IE	EE	D&EE	D&FE	D	G	G

Independent Variables: Contextual factors

We measure the different contextual factors that may influence which funding acquisition process is pursued by a new venture as follows (Aldrich and Fiol, 1994; Li and Zahra, 2012; North, 1990). Table 4.4 and Table 4.5 provide an overview. To begin with, we distinguish between ventures that hired at least one employee within the first three months of the funding acquisition process (1) and those who hired no employees in that time span (0).

The innovativeness of a venture's business idea was determined in a three-step process. In the first step, the founder was asked whether her business develops a radically new, incrementally new, or imitative product or service. In a second step, the interviewer (upon completion of the interview) cross-checked the founder's answer by comparing the venture's innovativeness with the innovativeness of the other ventures with which s/he had conducted interviews.

Table 4.4 Variable Description

Variable	Description
Founder Equity	Founder provided funding in return for shares of the venture
Insider Equity	Friends/Family/Former Colleague of a Founder provided funding in return for shares of the venture
Debt	Funding provided to the venture that is to be paid back, mostly with interest
External Equity	Institutional investor provided funding in return for shares of the venture
Grant	Funding provided by institutional financiers that does not need to be paid back (neither directly nor in the form of shares)
Type of Good	The type of good a venture (develops to) offer(s) on the market: Service, products or both
Degree of Novelty	The degree of novelty of the good the venture (is planning to) offer(s) to the market: Radical innovation, partial improvement or reproduction
Legal Type	The legal form under which the venture was initially registered: Limited or unlimited legal form
Solo PT Founder	The venture is created by a single founder who commits less than 35 hours per week to the venture: no or yes
1+ Employees	The number of employees hired by the venture during the first three months of the venture creation process: one or more, zero
Industry	The industry in which the venture is (chiefly) active: ICT or renewable energies
Loans to Private Sector (as % of GDP)	Domestic financial resources provided to the private sector by financial corporations, such as loans, purchases of non-equity securities, and trade credits and other accounts receivable that establish a claim for repayment ²
Stock market Volume (as % of GDP)	Market capitalization (also known as market value) is the share price times the number of shares outstanding (including their several classes) for listed domestic companies ³

In a third step, the person cleaning the data, again, cross-checked the degree of innovativeness indicated against the classification scheme he had developed while cleaning the entire dataset. In both step two and step three, the interviewer and the data cleaner relied on the information

² As defined and measured by the Worldbank

³ As defined and measured by the Worldbank

provided by the founder as well as on online information about the venture's business idea. This three-step process made it possible to minimize the over-estimation bias that typically occurs when founders self-report the level of their business' innovativeness. The degree of innovativeness is measured as imitation (0), incremental innovation (1) or radical innovation (2).

Furthermore, we determine whether a venture produces a tangible product (0), provides services (2), or a mixture of both (1). This variable was recorded in the same three-step process as the venture's innovativeness.

Industries are structurally different and induce ventures to pursue different business models, requiring distinct organisational structures (Sine et al., 2006) and thus different funding strategies (Gartner et al., 2012). Therefore, a venture's industry was included as a control variable. It was determined in a three-step process, where ventures were first sampled on the basis of NAICS industry codes and their business descriptions. In a second step, the person cleaning the samples drawn confirmed a venture's industry affiliation through online information, such as the venture's website. Finally, the founder was asked to confirm the venture's industry affiliation as part of the interview. We group ventures into ICT (0) and Renewable Energy (1) ventures. Ventures that have an affiliation with both industries are classified as RE ventures.

Controlling for ventures that are led by solo part-time founders allows us to single out founders who neither have major growth ambitions nor want to share decision-making power with others, which makes them likely to exclusively rely on founder funding. We group ventures into those set-up by a solo part-time founder (1) and those with all other founder (team) constellations (0).

In order to account for the condition of the financial market in which a venture was created, we control for the state of the debt and stock market in the year and country a venture was created. We operationalize these two measures as the volume of debt market and the size of the stock market expressed as a percentage of annual GDP per country. More concretely, we use World Bank data on bank loans given to the private sector (Demirgüç-Kunt and Maksimovic, 2002), as well as the volume of the stock market (Li and Zahra, 2012) as a percentage of GDP in order to characterize the broader financial framework in which a venture operates (Hirsch-Kreinsen, 2011; Lerner and Tag, 2013; Migendt et al., 2017).

Finally, we control for the legal form under which a venture was incorporated. The literature is divided about the effect of legal forms limiting owner liability. Some argue that limited liabilities might induce ventures to seek more debts because founders are not personally liable for them with their private assets (Gartner et al., 2012). Others argue that this is the exact reason why banks do not offer debt to ventures incorporated under limited liability forms (Berger and

Udell, 1998; Carter and Van Auken, 1990). While remaining agnostic about the effect of limited liability on debt funding, we code limited liability ventures as (1) and ventures registered under personally liable forms as (0).

Table 4.5 Dataset Descriptives

Variable	Value	N	in %
Country	US	191	25.07%
	UK	125	16.40%
	Germany	282	37.01%
	Italy	162	21.26%
	The Netherlands	38	4.99%
Innovativeness	Reproduction (0)	370	48.56%
	Incremental (1)	301	39.50%
	Radical (2)	91	11.94%
Type of Good	Service	234	30.71%
	Mix	402	52.76%
	Product	126	16.54%
1+ Employees	No (0)	479	62.86%
	Yes (1)	283	37.14%
Industry	ICT (0)	512	67.19%
	RE (1)	250	32.81%
PT Solo founder	No (0)	704	92.39%
	Yes (1)	58	7.61%
Legal Type	Unlimited (0)	95	12.47%
	Limited (1)	667	87.53%

4.3.2 Analyses

In line with our theoretical illustrations, we run two different types of analyses: (1) In a first step, we assess whether and, if so, how many ventures follow the funding acquisition process as prescribed by the pecking order theory or, respectively, the bootstrapping view. To this end, we illustrate what the most typical funding acquisition processes look like. To identify these processes, we use optimal matching (OM) techniques combined with cluster analyses, whereby the funding acquisition process constitutes the unit of analysis. The OM algorithm measures the distance between processes. If subsequently paired with cluster analyses, such sequence analyses allow us to explore and interpret patterns in longitudinal data (Halpin, 2010). We apply OM techniques because, when compared to other methods, OM has been found to deliver superior results in identifying patterns in sequence data in the context of management science (Biemann and Datta, 2014).

Given that more wide-ranging developments and applications of OM algorithms only occurred after the year 2000, OM can still be considered a fairly young method. Nevertheless, a standard way of running sequence analyses, based on OM techniques, has crystallized, which we here follow (Biemann and Datta, 2014). It includes four steps:

Step 1: Coding the Data

The first step consists in reporting the funding acquisition process of each venture on a monthly basis. More concretely, this means that a sequence of funding states, describing each venture's funding acquisition process, needs to be created for each venture. The reported funding acquisition process can vary in length for each venture as the length is a result of time that passed between the first funding activity and the end of the venture creation process.

As outlined in section 3 we ensure comparability with previous studies by distinguishing between 8 different possible values for funding state of a venture, namely:

- Founder Equity (FE)
- Insider Equity (IE)
- External Equity (EE)
- Debt (D)
- Debt & Founder Equity (D & FE)
- Debt & Insider Equity (D & IE)
- Debt & External Equity (D & EE)
- Grant (G)

Step 2: Define the Substitution Costs

In order to measure the distance between two funding acquisition sequences (as created in step 1), a cost needs to be assigned for replacing one state by any other state with the aim of transforming one sequence into the other. These so-called substitution costs range from 0 to an arbitrary maximum (here: 2) and are estimated on the basis of the relative frequency of transitions between two states within the entire dataset. Based on this transition frequency between any two funding states, a so-called substitution cost matrix is determined (Table 4.6). The substitution cost matrix obtained for our dataset intuitively makes sense as the substitution costs are lowest to transform each equity state into the same equity state combined with debt (see Table 4.6). For transformations of debt, costs are lowest for debt being transformed into any (of the three possible) combination/s with equity.

Table 4.6 Substitution Cost Matrix

	Founder Equity	Insider Equity	External Equity	Debt	Debt & FE	Debt & IE	Debt & EE
Insider Equity	1.974457						
External Equity	1.987821	1.994065					
Debt	1.976719	1.979975	1.988756				
Debt & FE	1.884100	2	2	1.906987			
Debt & IE	1.989639	1.937110	2	1.933587	1.987518		
Debt & EE	1.989822	1.990291	1.899141	1.939154	1.983458	1.989796	
Grant	1.963940	1.994576	1.974241	1.984778	1.990888	2	1.979354

Furthermore, it is overall less costly to transform grant funding into combinations with equity rather than with debt funding. Given that these transitions costs reflect the pecking-order arguments about the relative ease with which ventures can access (different types of) equity as compared to debts and grants, the transition costs – while relatively similar – reflect the relatedness of funding acquisition states.

Step 3: Calculating Sequence Similarity

Based on these substitution costs, it is then calculated (for each of the 762 sequences in our dataset) how costly it is to transform one sequence into any of the other 761 sequences. The cost of transforming one sequence into the other expresses their respective distance. To determine the distance of sequences that differ in length, we calculate their distance based on the length of the shorter of the two sequences. This reflects that the shorter of the two funding acquisition processes is unknown beyond the period observed and should thus not influence the distance measure. This novel solution was introduced in Held et al. (2018) and addresses an often voiced concern of using OM for analysing sequences in social science that vary greatly in length (Aisenbrey and Fasang, 2010).

Furthermore, we normalize the respective values of sequence difference by dividing them by the length of the shorter of the two sequences in order to maintain a comparable difference measure across sequence pairs. This results in a matrix which reports the distances between each sequence pair.

Step 4: Perform a Cluster Analysis

In the concluding step, the funding acquisition processes are clustered on the basis of their respective distances to one another. Consequently, each cluster obtained encompasses those processes that are particularly similar to each other, and distant to the processes of other

clusters. Accordingly, each cluster represents one of the most frequent and, thus, typical approaches to funding acquisition. We run the cluster analysis based on the Ward's minimum variance method, which has been shown to consistently produce the most accurate sequence clustering within the framework of OM analyses (Dlouhy and Biemann, 2015).

We use a combination of various partition quality measurements, namely the Weighted Average Silhouette Width (ASWw), R^2 , Point Biserial Correlation (PBC), and Hubert's C (HC) to determine the optimal clustering solution amongst all solutions between one and twenty clusters. These measures indicate how similar sequences are within one cluster and how different they are between clusters. Consequently, we calculated these indicators for one, two, three, etc., up to twenty clusters in order to determine their goodness of fit. In this way, we could determine for which cluster number the goodness of fit is maximized. In doing so, we could exclude those cluster solutions which either did not yield distinct approaches, because they clustered together too different sequences, or which spread out sequences over too many similar clusters.

(2) In order to provide meaning and context to the results of an exploratory process analysis, the next step is to understand "*what factors cause the different sequences observed*" (Van de Ven and Engleman, 2004, p. 355). We therefore use binary logistic regression models to identify the conditions that influence the pursuit of one funding acquisition approach (cluster) as compared to all other approaches (dependent variable).

Importantly, and in line with 'traditional' regression analyses, binary regressions following an OM procedure cannot determine causalities between an independent variable and the moment in which an activity occurred, because the entire process (or cluster) is taken as dependent variable.

Testing *Hypotheses 2-4*, we determine the explanatory power of a venture's innovativeness, its type of good, as well as whether it hired employees (independent variables). In addition, we control for the venture's legal form, whether it is led by a solo part-time founder, and the financial conditions in which the venture was created (control variables).

We fit the following model for each cluster to obtain the estimates:

$$\ln\left(\frac{p_i}{1-p_i}\right) = \beta_0 + \beta_1 \text{Innovativeness}_i + \beta_2 \text{Product}_i + \beta_3 \text{Employees} + \boldsymbol{\beta}' \mathbf{x}_i \quad (1)$$

where p_i denotes the probability that venture i belongs to the cluster rather than to any of the other clusters, β_0 reports the cluster's intercept, β_1 , β_2 , and β_3 represent the estimated coefficients for our independent variables, $\boldsymbol{\beta}$ is a vector of coefficients for the control variables, and \mathbf{x}_i constitutes a vector of control variables.

4.4 RESULTS

4.4.1 Funding types and sources

Before running the aforementioned analyses, it is useful to study the data descriptives.

Table 4.7 First funding acquired

1st funding acquired	N	in %
Founder Equity	587	77.03%
Insider Equity	66	8.66%
External Equity	32	4.20%
Debt	29	3.81%
Debt & FE	22	2.89%
Grant	21	2.76%
Debt & IE	3	.39%
Debt & EE	2	.26%
Total	762	100%

When looking at the order in which funding was acquired (Table 4.7), we observe, that more than three quarters of the ventures in our sample receive the first funding from their founders (77.03%).

While this supports a fundamental assertion of the POT and the financial bootstrapping theory alike, it also means that one quarter of the ventures do not follow the POT and bootstrapping expectations already from the beginning of their funding acquisition process. In addition, almost 9% of the ventures receive their first funding from equity insiders, which according to POT also belong to the earliest funding forms that ventures typically acquire. Nevertheless, a significant group of ventures remain that acquire their initial funding from providers of external equity (4.2%) or debt (3.8%), which runs counter to both POT and financial bootstrapping expectations.

When we do not only look at the first type of funding acquired, but also include the second type of funding that was acquired (see Table 4.8), the picture gets even more differentiated as we find further evidence that most funding acquisition processes are largely in line with the expectations of the financial bootstrapping theory. However, these results are also indicative of a great variety of different funding acquisition processes amongst nascent ventures: Accordingly, Table 4.8 depicts the six most common sequences of the first two funding types that ventures acquired. These five sequences make up 80.31% of our sample. Interestingly, more than half

of the ventures never acquire any other funding type than the investment they received from their founders (55.77%). Only 12.33% (FE / Debt & FE + FE/ Debt; 7.74% + 4.59% = 12.33%) of ventures follow up on the initial founder investment received with the acquisition of debt.

Table 4.8 First two types of funding acquired

1st / 2nd funding acquired	N	in %
FE / -	425	55.77%
FE / Debt & FE	59	7.74%
IE / -	42	5.51%
FE / Debt	35	4.59%
FE / Grant	31	4.07%
EE / -	20	2.62%
Total	613	80.31%

This picture gets even more diverse when we consider that the remaining 19.7% of the sample (i.e. those that are not included in Table 4.8) are distributed over different sequences with regard to their first two funding acquisitions. In order to explore this variety in greater depth, we now carry out the aforementioned OM sequence analysis. This does not only allow us to include more than two funding acquisition steps, it also takes the length of time it took ventures to acquire these funding types into account. In other words, it allows us to depict the actual funding acquisition process instead of singular funding acquisition events.

4.4.2 Patterns in funding acquisition processes

As outlined in the theory section, the funding acquisition processes of ventures have been researched at the meta level, so that our research question “*Do nascent ventures pursue different approaches to funding acquisition and, if so, how do these processes look like?*” has, thus far, not been answered. The partition quality measurements identify the solution of seven clusters (out of the overall 1-20 solutions considered) as optimal (ASWw = 0.77; $R^2 = 0.74$; PBC = 0.87; HC = 0.04). Each of these seven clusters (reported in Figure 4.1) represents one of the most typical funding acquisition processes with regard to its funding types and sources, as well as the timing and sequence in which funding is acquired. As a result, we can answer the first part of our research question with “yes: nascent ventures pursue overall seven distinct approaches to funding acquisition.”

Moving on to the second part of the research question, the results obtained from OM analyses also make it possible to illustrate what these funding acquisition processes look like. For each of the seven clusters, Figure 4.1 provides an overview of all funding acquisition approaches within the cluster, as well as the most representative sequence. The most representative sequence

('Representative Sequence') depicts the modal funding state for each month of the median process in each cluster. The distribution over these seven processes is highly skewed towards cluster 1 (FE). The 482 ventures pursuing the approach depicted in cluster 1 (FE) largely fund themselves through their founders' equity. The process is rather static in that only a few ventures add other funding sources at all; and those who do so, acquire additional funding rather late in the process. The dominance of one static funding process based on founder equity supports the financial bootstrapping approach, while it contradicts the expectations formulated in the POT in so far as POT expects ventures to routinely transition to other funding options. This, in turn, lends empirical support to proposition 1a that, until they reach profitability, the majority of nascent ventures exclusively rely on the founder's own resources to finance their business.

In addition, also the second largest cluster (Cluster 2, IE) lends support to the idea of financial bootstrapping as the cluster features ventures that largely depend on insider equity. As defined above, this state also encompasses months in which both founder and insider equity are simultaneously acquired. Cluster 2 thus depicts a funding acquisition process funded by both the venture founders and their immediate network. Taken together, 557 (73.1%) of the ventures in our sample (included in clusters 1 and 2) rely either on founder or insider equity to fund their development. The dominance of these two funding sources provides clear empirical support for the expectation of the financial bootstrapping literature as expressed in proposition 1a.

Beyond the two funding approaches of clusters 1 and 2, which are in line with the expectations of the financial bootstrapping literature, the OM sequence analyses reveal five distinct funding acquisition processes, which all heavily rely on funding beyond the equity of founders and their relatives or friends.

The funding acquisition processes of clusters 3 and 4 as well as 6 and 7 – and thus a minority of slightly more than 25% of all ventures – lend partial empirical support to proposition 1b. Clusters 3 (FE / Debt) and 4 (FE & Debt) report two distinct approaches characterised by the combination of founder equity and debt. The ventures included in cluster 3 combine these two funding sources in a dynamic transition process by first relying on founder equity and then debt after three months. Ventures pursuing the approach depicted in cluster 4 proceed slightly differently: They acquire debt and founder equity simultaneously and right from the beginning of venture creation. The existence of these two alternative funding approaches lend partial empirical support to the POT expectation that ventures turn to debt finance after (or next to) drawing on founder and insider equity. Contrary to that, the funding approach depicted in cluster 5, contradicts the expectations of both bootstrapping and POT theory, because cluster 5 (debt only) is clearly dominated by ventures that finance themselves almost exclusively through debt from the outset. This finding is particularly interesting, considering that debt is often assumed to be out of reach for nascent ventures. At the same time, cluster 5 is rather small ($n = 27$).

In line with clusters 3 and 4, also the funding approaches depicted in clusters 6 and 7 lend partial empirical support to POT reasoning: Ventures pursuing the approach of cluster 6 (external equity) strongly focus on acquiring external equity, typically next to using founder equity. In view of the attention paid to institutional equity both in the public discussion, as well as in the literature on venture funding, it is surprising how small the number of ventures is that belongs to cluster 6 (EE, $n = 39$). Cluster 7 (grant funding) features those ventures that acquire a grant as part of their funding acquisition process. This mostly happens in combination with initial equity provision by founders, which often continues throughout the grant application phase. Clusters 6 and 7 thus support the idea that ventures use external equity and grants in combination with founder equity. Contrary to the expectations of POT, however, ventures do not access different funding sources in one prescribed order but seem to focus on acquiring that funding type (next to founder equity) which they deem most favourable.

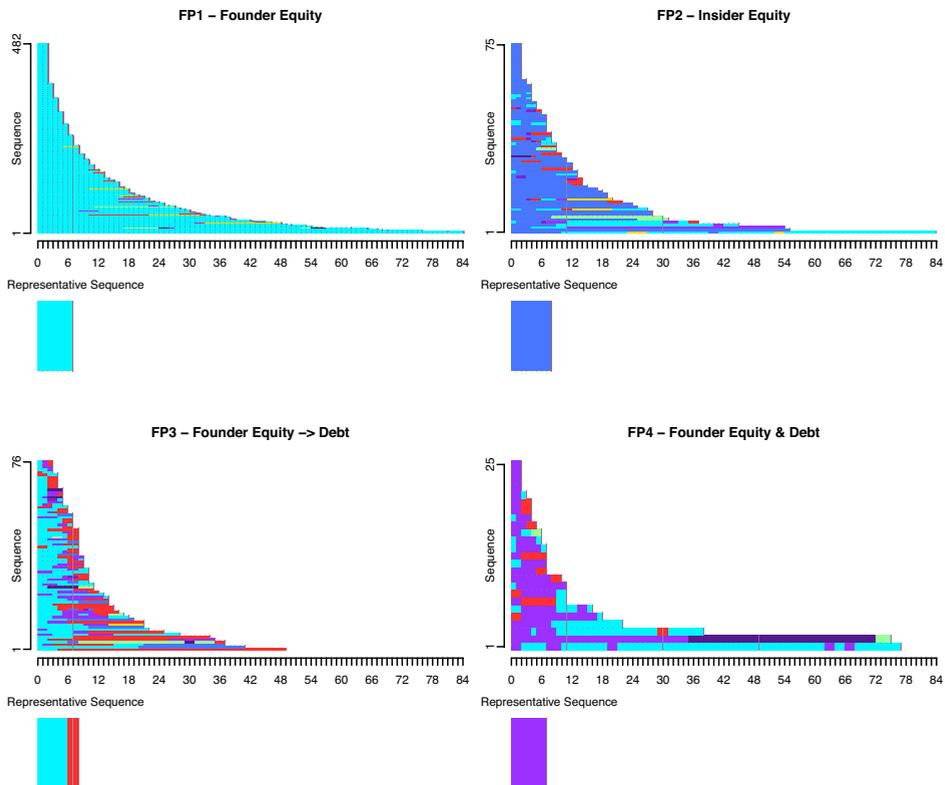


Figure 4.1 Distinct funding acquisition processes

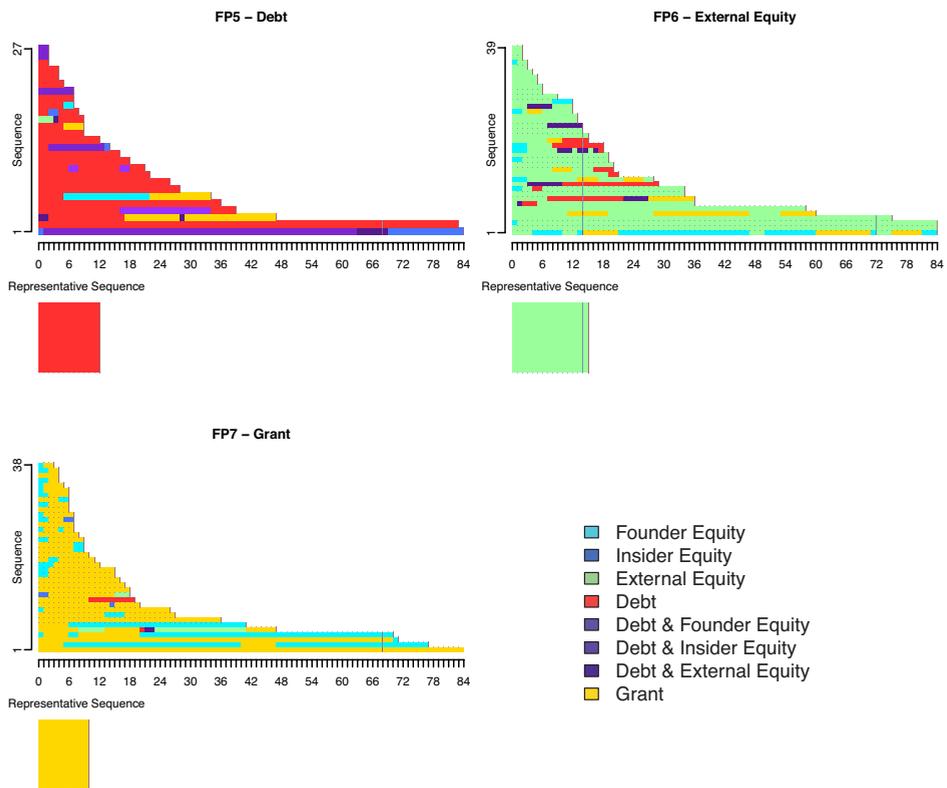


Figure 4.1 Continued

Taken together, empirical evidence provides clear support for proposition 1a, which – in line with the financial bootstrapping theory – proclaimed that the majority of nascent ventures is primarily financed by founder and insider equity. In contrast, we do not find empirical support for the POT notion that nascent ventures follow one prescribed funding acquisition process. Instead, we find that four (out of the overall seven) approaches to funding acquisition consist in acquiring just one source of external (debt or equity) funding beyond founder equity. This, in turn, lends partial empirical support to the POT (proposition 1b) that a minority of ventures transition to funding sources after exhausting founder and insider equity.

4.4.3 Determinants of approaches to the Funding Acquisition Process

After establishing the existence of seven distinct funding acquisition processes and describing their basic differences, we want to understand what factors influence the ventures' choice to follow a particular acquisition process. In other words, what drives the differences in the funding acquisition processes of ventures: Can the POT reasoning explain under which circumstances

ventures choose to pursue one rather than another funding acquisition approach? Table 4.9 provides an overview of the regression results obtained.

Table 4.9 Regression estimates for funding acquisition process clusters

Variable	Funding acquisition process cluster (Exp β)						
	FE	IE	FE / Debt	FE & Debt	Debt	EE	Grant
Type of Good							
- Mix	1.054	.688	1.122	.821	1.041	1.084	1.175
- Product	.406***	.833	2.619***	1.754	2.521	.913	3.090**
Degree Novelty							
- Incremental	.590*	2.423**	.154**	.394	.723	10.649***	2.952**
- Radical	.969	2.360***	.554*	.733	.266**	2.977**	1.259
Legal Type	1.072	.867	1.290	.421	.882	+	.523
Solo PT Founder	.829	2.403**	.575	1.274	.284	1.130	1.397
1+ Employees	.446***	.859	1.769**	2.653**	1.316	5.787***	1.587
Industry	.507***	.707	2.269***	3.039**	2.192*	1.324	1.552
Loans to Private Sector (in % of GDP)	1.007	.995	1.008	1.013	.998	.990	.974***
Stock Market Volume (in % of GDP)	.993	1.008	.990	.972*	1.018	1.004	1.031***
Intercept	2.636**	.107***	.037***	.038***	.010**	.000	.083***
Observations in Cluster	482	75	76	25	27	39	38
Observations in Model	762	762	762	762	762	762	762
R ²	.134	.051	.138	.162	.119	.243	.111

p-values *** < .01, ** < .05, * < .1, + all ventures in these cluster were registered as limited entities; hence no variation was observed, resulting in extremely large effect sizes

While financial bootstrapping makes it possible to derive clear-cut propositions about *the funding acquisition processes* pursued by the *majority* of ventures, pecking order theory proposes viable arguments about the *circumstances* under which a *minority* of ventures decides to access additional funding sources. Based on the POT reasoning, hypothesis 2 suggests that ventures with at least one employee are more likely to seek external funding after acquiring founder equity. We find clear evidence in support of this hypothesis as the hiring of employees is indeed a significant predictor of ventures acquiring debt funding in clusters 3 (FE / Debt) and 4 (FE & Debt), as well as of external equity in cluster 6 (EE). Similarly, ventures without

employees are significantly more likely to rely exclusively on founder equity (Cluster 1, FE: $\text{Exp } \beta = .446$; $p < .01$). Overall, the results of the binary logistic regression analyses thus lend empirical support to H2.

With regard to the ventures' innovativeness, the POT reasoning suggests that ventures developing radically new products are more likely to acquire external equity and grants after the initial founder investment (H3). This hypothesis is confirmed by the finding that the funding approaches relying chiefly on external equity (Cluster 6, EE) and grants (Cluster 7, Grant) next to founder equity are almost three times more likely to be pursued by ventures developing incrementally improved or radically new goods (Cluster 6, $\text{EE}_{\text{radical innovation}}$: $\text{Exp } \beta = 2.977$; $p < .05$; Cluster 6, $\text{EE}_{\text{incremental innovation}}$: $\text{Exp } \beta = 10.649$; $p < .01$ / Cluster 7, $\text{Grant}_{\text{incremental innovation}}$: $\text{Exp } \beta = 2.952$; $p < .05$). However, incrementally and radically innovative ventures are also particularly likely to fund themselves through internal equity (Cluster 2, IE). Yet, in line with the POT reasoning, innovative ventures are significantly less likely to rely on debt finance (Cluster 3, FE/Debt and Cluster 5, Debt). We thus find empirical support for hypothesis 3 and its underlying POT reasoning.

We also find support for the fourth hypothesis (H4), which proposes a relationship between the type of good a venture produces and the likelihood of acquiring debt funding in addition to the founders' investment. We observe that ventures developing products rather than pure services are highly unlikely (Cluster 1, FE; $\text{Exp } \beta = .406$; $p < .01$) to only fund themselves through founders' investment. Instead, product developing ventures are 2.6 times more likely to acquire debt funding after receiving founder equity (Cluster 3, FE / Debt; $\text{Exp } \beta = 2.619$; $p < .01$). We therefore conclude – in line with H4 and the POT reasoning – that there is a positive relationship between product developing ventures and their acquisition of debt funding.

Interestingly, we furthermore observe that the financial environment has little effect on the funding approach pursued by nascent ventures. Although there is a significant relation between the volume of loans provided to the private sector, as well as the volume of stock market capitalization, and the propensity of ventures to seek debt finance (Cluster 4) and, respectively, grant finance (Cluster 7), the effect sizes are rather small. Yet, as one might expect, ventures in countries with a higher stock market capitalization are less likely to seek debt finance after founder equity (Cluster 4, FE & Debt: $\text{Exp } \beta = .972$; $p < .1$), while grants seems to be in lower demand when loans are more common (Cluster 7, Grant: $\text{Exp } \beta = .974$; $p < .01$).

Out of the remaining control variables, all prove to be significantly correlated with distinct funding approaches. We find that cluster 6 (EE) consists entirely of ventures registered as limited companies, which leads to an extremely large effect sizes for this variable. Furthermore, we observe that ventures active in the renewable energy sector are less likely to solely finance

themselves through founder equity (Cluster 1, FE) but instead choose debt-based funding approaches (Cluster 3-5, FE / Debt, FE & Debt, Debt). Considering that ventures in the renewable energy sector are more likely to require larger scale production machinery than their counterparts in the ICT sector, these collaterals may well explain why renewable energy ventures – like product developing ventures – find it easier to obtain debt finance. Finally, we find interesting correlations between solo part-time founders and their funding acquisition approaches: Solo part-time entrepreneurs are likely to not only finance their venture themselves but together with insider equity providers (Cluster 2, IE: $\text{Exp } \beta = 2.403$; $p < .05$).

4.5 DISCUSSION AND CONCLUSIONS

The funding that (nascent) ventures acquire has been shown to influence their survival, speed and performance (Berger and Udell, 1998; Hechavarría et al., 2016; Shane and Venkataraman, 2000). Although a growing literature provides an initial understanding of the interplay between context and venture funding, research on the funding acquisition *processes* of nascent ventures is still limited (Block et al., 2018a; Cassar, 2004; Drover et al., 2017).

With this study, we are able to bring the funding acquisition process of the individual venture to the forefront (Cassar, 2004; Harrison et al., 2004). Instead of being obscured by contradicting trends in meta-data on investment volumes, we are able to discern distinct funding acquisition processes at the venture level, thereby aiming to contribute not only a more fine-grained view on nascent venture funding but also to extend previous work on start-up financing (Bhide, 1992; Cassar, 2004; Gartner et al., 2012; Vanacker and Manigart, 2010; Winton and Yerramilli, 2008).

Our two main propositions (1a and 1b) revolve around two alternative and, at first sight, opposing theories towards explaining funding approaches of early-stage ventures (Cosh et al., 2009; Jonsson and Lindbergh, 2013). On the one hand, the financial bootstrapping literature based on resource-dependence theory proposes that nascent ventures are confined to founder and insider equity because of unfavourable power relations in the market for institutional debt- and equity finance (Ebben and Johnson, 2006; Grichnik et al., 2014; Winborg and Landström, 2001). On the other hand, the pecking-order theory suggests – based on principal agent considerations – that nascent ventures move beyond founder finance, although information asymmetry and adverse selection make it harder for nascent ventures to tap into market-based finance (Berger and Udell, 1998; Cosh et al., 2009; Hechavarría et al., 2016).

Our analyses reveal that seven distinct funding acquisition processes exist. Based on our results, we can assert that the *majority* (i.e. about 75%) of ventures relies on financial bootstrapping. Interestingly, by far the most common process is a static one that almost exclusively relies on equity provided by the venture's founders. Next to that, we observe that a *minority* (namely about 25%) of nascent ventures to follow a process of transition from funding based on founder equity towards debt, external equity and grant funding. This, in turn, suggests that a minority of nascent ventures partially 'behaves' as suggested by POT scholars.

Our finding that a minority of nascent ventures pursues funding-acquisition processes in line with the POT reasoning is further supported by the assessment of three hypotheses on the conditions that lead nascent ventures to go beyond pure founder funding and transition to market-based finance:

The decision to hire employees (H2) is typically perceived as a sign of growth ambitions, which leads both to the necessity and opportunity to go beyond funding based on founder equity. Accordingly, we find that nascent ventures with employees acquire debt and external equity after, or next to, relying on the equity investment of their founders (Busenitz et al., 2005; Gartner et al., 2012; Storey, 1994). Argumentum e contrario, we find that nascent ventures without employees tend to rely solely on their founder's equity throughout the venture creation process.

Similarly, innovative ventures target external funding early on (H3), whereby they are more likely to acquire external equity or grants than debt funding. These findings are not only in line with previous research (Gartner et al., 2012; Hechavarría et al., 2016; Robb and Robinson, 2014), they also corroborate the idea that external equity providers generally take on a more active advisory role than debt providers (Barney et al., 1996; Hsu, 2006; Sorensen, 2007). However, in contrast to the notion that equity finance might be especially suitable for ventures with radical innovations (Drover et al., 2017; Dutta and Folta, 2016), we find a stronger association of equity-financed ventures for incrementally innovative ventures.

As expected by the POT reasoning, also nascent ventures developing tangible products (H4) are more likely to transition from founder funding to debt-based finance than service (Berger and Udell, 1998; Cosh et al., 2009; Lee et al., 2015).

Based on these findings, our paper makes it possible to better understand the applicability of bootstrapping and, respectively, POT arguments. In circumstances where nascent ventures remain without employees, develop services, or already existing business ideas, financial bootstrapping is applicable as the venture founders exclusively rely on their own equity to fund their venture. This is the case for the majority of nascent ventures. However, in a minority of cases, where nascent ventures hire employees, develop products, or bring innovative goods to the market, POT theory makes applicable propositions about why these ventures acquire debt, external equity, or grant funding after, or next to, relying on their founders' equity. Our findings are in line with the insight of recent discussions (Bertoni et al., 2015; Block et al., 2018a; Drover et al., 2017; Howell, 2017) that external investors provide funding only to a small number of nascent ventures (Ang, 1992; Cosh et al., 2009; Grichnik et al., 2014). Taken together, our paper thus contributes to a more comprehensive understanding of early-stage financing options of nascent ventures (Davidsson and Gordon, 2012, 2009).

Furthermore, our paper also offers an important methodological contribution. By applying optimal matching techniques to analyse funding acquisition processes, we illustrate how this novel methodological approach can be used in business and management research. Our research thus offers a methodological answer to the long-standing call for systematic insights

into how venture creation processes unfold over time in general (McMullen and Dimov, 2013; Moroz and Hindle, 2012; Ruef, 2005; Ucbasaran et al., 2001; Van de Ven and Engleman, 2004) and funding acquisition process in particular (Dimov, 2010; Gartner et al., 2012; Hechavarría et al., 2016).

Finally, our research has important implications for entrepreneurs and policy makers alike: Based on the results of our study, we recommend that entrepreneurs seeking external capital should focus on the acquisition of debt finance if their venture develops tangible products. For radically and incrementally innovative ventures, in turn, it is rather recommendable to try and acquire external equity and grants. Ventures hiring employees from the outset should signal their growth ambitions to potential debt- and equity providers as these financiers are particularly likely to offer funding.

Interestingly, policy discussions on entrepreneurial finance have often focused on innovative ventures with growth ambitions (Shane, 2009). Our analyses show that, in the early stages of the venture creation process, only few companies fall in this category. The majority bootstraps their finance from owner and insider equity which is both (easily) accessible and convenient. Entrepreneurial finance policies might thus be more successful in stimulating nascent entrepreneurship if they target the majority (rather than a small minority) of nascent ventures, for example by offering tax breaks to founders, their family and friends investing into nascent ventures.

Last but not least, our research is subject to a set of limitations. To begin with, our dataset would have benefitted from both a larger N and a larger variety in terms of industry and country coverage. What is more, we almost exclusively included static drivers (such as a venture's industry, innovativeness, or goods developed) to explain variations in dynamic processes. While dynamic determinants that vary over time would have been desirable, they would have led to an additional – and thus undesirable – methodological complexity. Furthermore, we capture the dynamics of supply and demand for finance in the resource acquisition process to a somewhat limited extent, because we could only track successful funding requests. While massive data collection efforts would be necessary to address the first and final limitation, future research would benefit from including dynamic independent variables to assess their influence on the sequence and length of funding acquisition processes.



CHAPTER 5

Whom do Nascent Ventures search for? Variance of Linkage Formation Activities during New Product Development Processes

This chapter is based on: L. Held, A.M. Herrmann, C. Storz: Whom do Nascent Ventures search for? Variance of Linkage Formation Activities during New Product Development Processes. Submitted to *Small Business Economics*.

ABSTRACT

External linkages allow nascent ventures to access crucial resources during the process of new product development. As a result, forming external linkages can substantially contribute to a venture's performance. However, little is known about the type of external linkages nascent venture form, as well as the order in which they are formed, or under which circumstances certain type of linkages are favoured. Addressing this gap, we identify distinct patterns of external linkage formation activities during the new product development process of nascent ventures, as well as the circumstances under which these linkages are formed. Our analyses are based on a novel dataset on 370 venture creation processes, which we explore with optimal matching technique in order to reveal patterns of linkage formation activities during the new product development process. We find that nascent ventures pursue one of overall four distinct approaches new product development, and that if they engage in external formation at all, they form *either* research linkages *or* market linkages. Second, we show that strategic needs as well as venture characteristics shape the formation of linkages. Regarding the former, the innovative strategy of a nascent venture significantly influences which type of linkage formation the venture engages in. Third, we show that resource constraints – i.e. underdeveloped firm-level opportunities – constitute a barrier to external linkage formation.

5.1 INTRODUCTION

Entrepreneurship scholars have emphasized that forming external linkages during the new product development process substantially contributes to a firm's performance (Chapman et al., 2018; Dahlander et al., 2016; Leiponen and Helfat, 2011; Meyskens and Carsrud, 2013). The linkages built to external partners during the development process of new products have been associated with a variety of positive outcomes, including greater product novelty and better product performance (Hoang and Rothaermel, 2010; Nieto and Santamaría, 2007; Rothaermel, 2001), in particular for nascent ventures that often face resource scarcity (Haeussler et al., 2012; Hoang and Antoncic, 2003; Meyskens and Carsrud, 2013).

Existing studies suggest that the resource base of a venture can explain both the strategic need and opportunities for linkage formation (Ahuja, 2000; Eisenhardt and Schoonhoven, 1996). With linkages we refer to the "coming together of diverse interests and people to achieve a common purpose via interactions, information sharing, and coordination activities" (Jassawalla and Sashittal, 1998, p. 239). Forming external linkages can be driven by strategic needs, in particular the need to access external knowledge (Alvarez and Barney, 2001; Ireland et al., 2002), as well as by the opportunities open to the firm (Eisenhardt and Schoonhoven, 1996), because of its knowledge base (Leiponen, 2005; Okamuro et al., 2011; Soh, 2003) and its size (Almeida et al., 2003).

However, today's analyses of external linkages formed for the purpose of new product development suffer from three shortcomings. First, existing studies on linkage formation are often based on a rather coarse-grained distinction of the different types of linkages in new product development processes. With few exceptions (Fitjar and Rodríguez-Pose, 2013; Hoang and Antoncic, 2003; Hoang and Rothaermel, 2010; Meyskens and Carsrud, 2013; Rothaermel and Deeds, 2004), prior studies do not systematically distinguish between the two most important types of external linkages, namely *exploration-oriented research linkages* and *exploitation-oriented market linkages*. In particular, we do not know how exploration and exploitation oriented linkages are formed over time: Are they indeed formed sequentially, as is mostly assumed in the literature (Burgers et al., 2008; Lee et al., 2010)? Or are they formed in parallel; or are they even mutually exclusive? Ignoring the variance and order of these two, very different functions of external linkages can lead to unclear results as this bears the risk of "aggregation bias" (Hoang and Rothaermel, 2010, p. 735): Assuming that the order of external linkage formation of nascent ventures is first exploration- and then exploitation-oriented may well overlook a larger variety in linkage formation activities.

Second, the literature remains largely silent on how a venture's strategic needs and opportunities, such as limited human resources (Chun and Mun, 2012), influence how nascent ventures choose to develop their new products by engaging in exploration and/or exploitation-oriented linkage activities. Such insights are however needed to better understand the options nascent ventures have in developing new products in collaboration with external partners.

Third, ventures may well be short of resources, which is particularly true for nascent ventures. The lack of firm-level resources may turn into an important barrier to external linkage formation. Prior studies on entrepreneurial linkage formation are often based on samples of ventures which have formed linkages (Alvarez and Barney, 2001; Carayannopoulos and Auster, 2010). As a result with the exception of (Almeida et al., 2003), research on linkage formation activities of *nascent* ventures, which are not sufficiently equipped with resources, remains under-developed.

While firms increasingly rely upon external actors in their product development (Freitas et al., 2011; Powell et al., 1996), we thus have little knowledge of the types and order, as well as the circumstances, of linkage formation activities of nascent ventures. To put it differently, we lack over-time insights into how, when, and why founders add more diversity to their venture's resource base in order to develop their products together with external partners. To address this research gap, we ask *whether distinct sequences of linkage formation to external partners during new product development processes of nascent ventures exist, how these sequences differ over time, and which circumstances explain a venture's choice to pursue one rather than another process.*

We do this by investigating new product development processes of nascent ventures based on a novel and dynamic dataset of 370 nascent ventures in Europe (UK, Germany, Italy, The Netherlands) and the US. This database makes it possible to identify different approaches towards exploration- (i.e. research-) oriented and exploitation- (i.e. market-) oriented linkage formation from the beginning until the end of a venture's new product development process. To this end, we apply sequence analyses based on optimal matching techniques, a novel methodology which offers fine-grained, over-time insights into linkage formation sequences in product development processes by comparing entire processes rather than individual moments points over time. Sequence analyses thus offer truly dynamic insights into how processes unfold over time, rather than to dissect processes into probabilities of events at specific moments in time. This, in turn, makes it possible to identify the most frequently pursued processes and to illustrate how these evolve over time. In addition, we use binary logistic regressions to identify the circumstances in which nascent ventures choose to pursue one rather than another linkage-formation process when developing their new products.

The contributions of our analyses are three-fold: First, nascent ventures pursue one of overall four different approaches towards linkage formation during their new product development processes. Most strikingly, we find that – next to in-house product development – nascent ventures engage *either* in exploration-oriented research linkages or in exploitation-oriented market linkages to develop new products with external partners. This finding allows us to substantially qualify those strands of the literature which assume that innovative firms, including established ventures, tend to form first exploration- and then exploitation-oriented linkages (Burgers et al., 2008; Lee et al., 2010; Rothaermel and Deeds, 2004).

Second, we show that strategic needs as well as firm-level opportunities shape the formation of linkages. Regarding the former, the innovative strategy of a nascent venture significantly influences which type of linkage formation the venture engages in. Regarding the latter, the number of employees is an important venture characteristic, which embodies the ventures capacity to form linkages and drives the choice of either research- or market linkages. This finding add a resource-based view perspective on nascent ventures as it illustrates the crucial role of existing resources for the type and quality of linkage formation processes. (Ahuja, 2000; Eisenhardt and Schoonhoven, 1996; Rothaermel and Deeds, 2004).

Third, we show that resource constraints constitute a barrier to external linkage formation. By illustrating that resource scarcity may work as a strong barrier towards linkage formation, we contribute to the entrepreneurship literature as we show that nascent ventures may simply lack the necessary resources for enhancing their performance through external linkages (Chapman et al., 2018; Dahlander et al., 2016; Leiponen and Helfat, 2011; Meyskens and Carsrud, 2013).

5.2 EXTERNAL LINKAGE FORMATION BY NASCENT VENTURES IN NEW PRODUCT DEVELOPMENT

New product development and innovation are important for a firm's competitiveness (Hoang and Rothaermel, 2010; Nieto and Santamaría, 2007; Rothaermel, 2001), and linkages to external actors are an important means to gain access to knowledge (Carayannopoulos and Auster, 2010). To assess how nascent ventures, build linkages to external partners in order to develop their new products, we first review the literature on new product development of nascent ventures. We highlight the distinction between exploitation- and then exploration-linkages. We then turn to theorizing about how a venture's strategic needs and its firm-level opportunities are likely to induce certain linkage formation patterns. As we describe in greater detail below, these circumstances shape the emergence of previously unexamined patterns of external linkage formation in new product development processes of nascent ventures.

5.2.1 New product development and patterns of external linkage formation

Patterns of linkage formation activities to external partners can be derived from the established exploration-exploitation framework of organizational learning (March, 1991) which Rothaermel et al. (2004) have extended to learning in inter-firm linkages. According to this framework, external linkages allow ventures to mobilize resources, but depending on the resources which are needed, these linkages fulfil different functions: They may either support the knowledge exploration or the knowledge exploitation of ventures. Knowledge *exploration* is related to research activities which allow firms to discover something new (such as obtaining joint patents, developing and improving products, or defining new technical standards), while market linkages allow knowledge *exploitation* (such as the implementation, commercialization and refinement of knowledge (March, 1991; Rothaermel and Deeds, 2004). In line with this framework, we distinguish between research (i.e. exploration) and market (i.e. exploitation) linkages to external partners for joint product development.

With regard to their order, the exploration-exploitation literature assumes that innovative firms, including established ventures, tend to form both types of linkages in a sequence, namely first exploration- and then exploitation-oriented linkages (Burgers et al., 2008; Lee et al., 2010; Rothaermel and Deeds, 2004): In a temporal view, research linkages are often built up in early stages and are combined with market linkages in later stages of the product development as the former provide new knowledge embodied in the prototype while the latter provide complementary resources like regulatory knowledge, knowledge of customers and particular markets, and distribution, transforming the new knowledge into a marketable product (Rothaermel and Deeds, 2004). Hence, this literature assumes a strategic need for both research and market linkages. In the following, we extend this line of reasoning to nascent ventures.

5.2.2 Strategic needs and external linkage formation patterns of nascent ventures

Eisenhardt and Schoonhoven (1996) suggest that the resource-based view helps to better understand why and which linkages are formed: Linkages are formed because there is the strategic need to access knowledge and information which is not available within the firm (Ireland et al., 2002). Indeed, substantial empirical evidence has shown that firms, in particular new firms (Hoang and Antoncic, 2003), tend to establish ties to those actors that allow access to critical resources (Geletkanycz et al., 1997). Knowledge needed for new products – which includes both, new products and new services (Easingwood, 1986) – has become increasingly complex and is increasingly distributed across various market participants. Consequently, the identification of, and the access to, complementary knowledge sources may provide informational advantages (Chapman et al., 2018; Meyskens and Carsrud, 2013; Nieto and Santamaría, 2007). The ability to manage such linkages is thus considered to be a source of competitive advantage in particular for nascent ventures (Glaister, 1998; Ireland et al., 2002).

The strategy literature suggests that the logic of strategic needs can be expected to influence the choice of which type of external linkages are formed during the new product development process. The most relevant strategic difference across ventures is their degree of innovativeness as it helps firms to differentiate from their competitors in the market (Eisenhardt and Schoonhoven, 1996). External linkages provide ventures with an innovative strategy either with technological (exploration) or marketing (exploitation) knowledge, or a combination thereof. External linkages can thus be understood as a means for the innovative venture to add complementary competences and to move more quickly into new markets.

Importantly, the need to access new technologies and new markets depends on the venture's strategy: Ventures developing innovative goods with a high degree of novelty have different needs than less innovative ventures. More concretely, ventures developing innovative goods are in need of new knowledge and new markets, in contrast to non-innovative ventures (Lechevalier et al., 2014; Malerba, 2007). As a result, ventures that aim at developing innovative products need to solve two problems: they need to access technological knowledge not available within the venture, and to identify potential new markets for their new product (Eisenhardt and Schoonhoven, 1996). The identification of new technological knowledge is driven by the need to concentrate the scarce venture's resources on the difficult job of keeping and developing its core competences in research while leveraging the resources of the research partner in other functional areas of technological research. Furthermore, innovative ventures are often uncertain about the concrete commercial applicability of their product development and, thus, their markets. In contrast, firms with less innovative strategies have simply no need to improve the strategic position of the venture in the exploitation and exploration phase.

In line with the literature, we therefore expect that ventures which have been founded with the strategic goal of developing an innovative product will, from the outset onwards, aim at establishing external linkages, namely first research linkages to explore complementary new technological opportunities and then market linkages to exploit and commercialize their goods (Burgers et al., 2008; Lee et al., 2010). We therefore expect innovative ventures to first form research, then market linkages:

Hypothesis 1: During their new product development process, nascent ventures developing innovative products are more likely than non-innovative ventures to form first research and then market linkages to external partners.

5.2.3 Opportunities and external linkage formation pattern of nascent ventures

Our first hypothesis on the strategic need as a determining factor for linkage formation emphasizes the particular challenges that nascent ventures face as a result of being subject to liability of smallness and liability of newness. That is, nascent ventures add linkages to their resources when pioneering technologies are an important element within their resource structure. However, linkage formation also relies on the existing firm-level opportunities. While a variety of different opportunities exist, we here concentrate on one of the most important ones, namely the venture's size. As we will argue, this opportunity provides important additional logics in entrepreneurial decision making to form linkages to external partners during the new product development process.

Opportunities for linkage formation and the firm's characteristics

While studies have traditionally focused on the role of founders in linkage formation, (Østergaard et al., 2011) take a broader perspective and analyse the role of *employees* in the new product development process. They argue that the knowledge base of a firm is not only related to the founders' knowledge, but that firms draw on different knowledge bases from all levels of the organization. The composition of the founding team alone therefore does not necessarily reflect the composition of the larger pool of human capital within a firm.

We extend this view on the importance of employee's in the venture creation to the choice of external linkages and take all employees within the firm into account. Coad and Guenther (2014) find that the hiring of employees precedes the commercial exploitation phase of the new product development process. Not only does the hiring of employees provide a company with required resources to drive the exploitation of a new product, in the case of nascent ventures it also provides a mean to signal legitimacy to external partners (Koch et al., 2013). Considering that hiring an employee often represents a significant investment for nascent ventures, Coad et al. (2016) argue that ventures postpone hiring employees until they expect sales to rise (Coad et al., 2016), thus are in the exploitation phase of product development.

We therefore expect that the hiring of employees both, enables and induces ventures to form market rather than research linkages:

Hypothesis 2: During their new product development process, nascent ventures with more employees are more likely than nascent ventures with fewer employees to first develop a new product in-house and then form external market linkages.

Opportunities for linkage formation and resource constraints

Firm-level opportunities do not only explain which external linkages are chosen; they also explain why external linkages are *not* formed. While external linkages may provide informational advantages (Chapman et al., 2018; Meyskens and Carsrud, 2013; Nieto and Santamaría, 2007), they entail costs, in particular search costs and costs of making connections to external parties (Hennart, 1991). The formation and choice of linkages therefore needs to be understood as a trade-off between these costs and the resources available at the firm-level that allow for such a search. Given that the venture's resources provide the opportunities for linkage formation (Eisenhardt and Schoonhoven, 1996), their non-availability constrains linkage formation. Resource scarcity translates into opportunity scarcity. Hence, an important condition that shapes venture's opportunities to establish external linkages are its human resources. Depending on the (founder and employee) resources available at the firm-level, opportunities for creating and entering external linkages differ substantially across firms (Ahuja, 2000; Hoang and Antoncic, 2003). As the size of ventures matters for the linkage formation activities undertaken (Shan et al., 1994), larger ventures with more founders and employees find it easier to form linkages during the new product development process than small ventures.

This reasoning is particularly applicable to nascent ventures. Individual entrepreneurs can simply not scale themselves up as larger ventures can, so that "lone entrepreneurs" (Klotz et al., 2014), which are neither equipped with co-founders nor employees, have a finite search time (Dahlander et al., 2016): When nascent ventures are small in size, their human resources are limited, so that the entrepreneur herself needs to carry out the search. The search for external partners thus causes particularly high opportunity costs, because external search activities take the entrepreneur's attention away from other internal activities (Dahlander et al., 2016). Given that attention is a fixed resource and not infinitely elastic, small nascent ventures tend to have less opportunities to search for external partners. Indeed, a number of studies has shown a negative association between firm size and collaboration intensity (Chun and Mun, 2012). We therefore expect that nascent ventures with limited resources in terms of their founder team and employees have hardly any opportunities to form linkages to external partners:

Hypothesis 3: During their new product development process, nascent ventures that are resource-scare in terms of their founder team and employees are more likely than resource-rich ventures to develop their product solely in-house.

5.3 METHODS AND DATA

5.3.1 The Data: Sample and operationalization

To test the above hypotheses, we draw our data from a unique firm-level dataset entitled “Perfect Timing Database”, which contains overall 870 nascent ventures and their start-up processes. More concretely, founders of these ventures were interviewed about the activities they undertook between the start and end of venture creation. The interviews were carried out with founders in two waves between 2011 and 2018, based on computer-assisted telephone interviews by an international research team located in Utrecht (The Netherlands), New York (US), Germany (Düsseldorf and Cologne), London (UK), and Palermo (Italy). In order to capture possible variations in venture creation processes, the population interviewed includes ventures of all legal forms (excluding sole proprietorship) that were registered between 2004 and 2014 in the information technology (IT) and renewable energy (RE) industries in Germany, Italy, the US, The Netherlands and the UK. From this population, founders were randomly selected and invited to participate in an interview about the venture creation process of their venture until a representative sample of 870 cases had been obtained. Out of these 870 cases, we isolated those 370 ventures that indicated to have developed a new product as part of their venture creation process. All further analyses are based on these 370 ventures.

The data was collected with an explicit focus on the sequencing of venture creation activities, including external linkage formation activities, which allows us to study patterns of linkage formation in ventures’ new product development processes. Given that the dataset covers the initial phase of the venture creation process, it provides dynamic insights into the activities of nascent ventures. More concretely, the venture creation processes covered in the database begin with the moment when a founder first discussed the idea to set-up the respective venture with another person and it ends at the moment in which the venture in question became profitable, was merged, acquired, or went bankrupt. If none of these events occurred until the date of the interview, the process of venture creation was categorized as ongoing and recorded up to a maximum duration of 84 months. The shortest venture creation process included in the below analyses thus is three months, the longest one is 84 months.

The new product development process, which is at the core of our study, constitutes a sub-process within the overall venture creation process. It covers the period from the beginning of the internal product development activities until the moment of the last registered product development activity. With regard to the linkage formation activities undertaken during this new product development process, the dataset reports which activities were undertaken to develop the product on a monthly basis.

Given that the data collected relies on the founders' memory about activities they undertook in the past, there is a risk of recall bias, especially in longer venture creation processes. Founders may simply not remember well which and when they undertook activities. This, in turn, would negatively affect the reliability of the data collected. To address the risk of recall bias, the questionnaire was constructed in such a way that the founders were guided from major (formal) events (such as the registration of their venture) to minor events (such as the date when they entered an industry association). The major events were taken as anchor points to reconstruct the moments of minor events. Importantly, the interview processes showed that giving birth to a venture is similar to giving birth to a child: the core moments are never forgotten and/or can always be reconstructed. Yet, to cross-check the data validity, the interviewers carried out follow-up interviews with co-founders of the same venture, as well as with the same founder 9-48 months after the first interview. These second interviews demonstrated very high interrater agreements across the dataset.

The use of this unique dataset has three important advantages: First, to the best of our knowledge, this survey is currently the most detailed one on new product development processes in nascent ventures. Given that it provides evidence on a monthly basis, it provides sound dynamic insights into the product development and linkage formation activities of nascent ventures. Second, thanks to the sophisticated interview techniques applied, the reliability of the data reported is high, as has been demonstrated through second interviews with both founders and co-founders. Third, thanks to the random interview sampling, the ventures surveyed are – within the IT and renewable energy industries – representative in terms of their legal forms, geographic coverage and the novelty of their products.

5.3.2 Measures

Dependent variable

The dependent variable (*new product development process*) refers to the process with which a venture develops its new product in-house or through research and market linkages. Of course, a venture can simultaneously develop its product in-house and through external linkages. Therefore, we distinguish between three basic ways of new product development (in-house, research linkages, and market linkages) and account for possible combinations thereof, resulting into seven possible states that can occur in a venture's new product development process (see Table 5.1). This distinction allows us to differentiate not only between different combinations of linkages, but also to differentiate between parallel and sequential patterns of linkage formation activities. Given that the data about these in-house development and linkage activities are provided on a monthly basis, we can run fine-grained sequence analyses of how new product development processes unfold in nascent ventures over time.

Table 5.1 Linkage Formation Activities in New Product Development Processes

In-house Development	External Linkages	In-house Development & External Linkages
In-house Development (ID)	Market Linkage (ML)	ID & ML
		ID & RL
	Research Linkage (RL)	ML & RL
		ID & ML & RL

We operationalize linkage formation as follows: A venture's membership in a R&D project with one or more external partners is taken as a proxy for the formation of a research linkage. In our survey, entrepreneurs explained their motivation to enter such a research linkage with the access to new technological knowledge. Table 5.2 provides a detailed overview of ventures' motivation to join an industry association or R&D project. In turn, a venture's membership in an industry association or consortium is taken as a proxy for the formation of a market linkage as entrepreneurs indicated that entering the association was chiefly motivated by their need for exploiting related knowledge, such as obtaining information about market participants (see Table 5.3). Whenever a nascent venture formed either a research or a market linkage, we determined the month and year of the linkage formation start as well as the month and year of the formation end.

Table 5.2 Motives to enter R&D Collaboration (Research Linkages)

Type of Linkage	N	in %
Development	104	75.4%
Research & Development	13	9.4%
Research	14	10.1%
Other	7	5.1%
Total	138	100%

Table 5.3 Motives to enter Industry Associations (Market Linkages)

Type of Linkage	N	in %
Market	105	70.0%
Market & Research	14	9.3%
Other Business Contacts	31	20.6%
Total	150	100%

This classification allows us, for each nascent venture, to develop fine-grained sequences of linkage formation patterns. Table 5.4 provides an example. In this example, the new product development process takes place over a period of 9 months, which corresponds to the period

from the beginning of product development to the moment when the venture creation process was completed. During the first two months, the venture develops the new product in-house. In month 3, the ventures start to jointly develop the product with an external partner, say, a research lab and thus forms a research linkage. The research linkage is maintained until month 5. In month 5, the venture additionally creates a market linkage by entering an industry association to assure the product's market fit. In month 8 it enters another research linkage to improve the product. The row "sequence of states" aggregates the linkage formation activities for every month to a sequence of linkage formation activities during the new product development process. In a later step, these new product development processes are aggregated and clustered (see below):

Table 5.4 Example of a Sequence of External Linkage Formation Activities in a New Product Development Process

Type	Month								
	1	2	3	4	5	6	7	8	9
In-house	ID	ID	ID	ID	ID	ID			
External			RL	RL	RL			RL	RL
					ML	ML	ML	ML	
Sequence of States	ID	ID	ID & RL	ID & RL	ID & RL & ML	ID & ML	ML	RL & ML	RL

Independent Variables

In line with the above hypotheses, the key independent variables studied include (H1) a *product's novelty*, the venture's (H2) *number of employees*, as well as – argumentum e contrario – the (H3) *limited human resources* of nascent ventures with regard to their number of founders and employees.

The variable *product novelty* refers to a product's innovativeness relative to those of other firms. To be more specific, a product's novelty has been defined in three steps. First, the founder was asked how novel her product idea was when the venture was founded. Second, each interviewer was trained in the industry's main innovative products and was thus able to compare a product's novelty across the industry – a skill which was refined with each interview conducted. Interviewers were thus able to cross-check the founder's answer by comparing the product's innovativeness with those of other ventures. In the third step, the three project coordinators (familiar with the industries' main innovations thanks to their longstanding experience in data cleaning), again cross-checked the product's novelty indicated against a classification scheme that was developed while cleaning the entire dataset. In both step two and step three, the interviewer and the data cleaner relied on the information provided by the founder as well as on online information about the venture's business idea. While subjectivity is a typical problem in survey analysis, this three-step process made it possible to minimize the over-estimation

bias that typically occurs when founders self-report the level of their business' innovativeness. The product's novelty was measured as imitation (0), incremental innovation (1), and radical innovation (2). Innovative ventures are thus defined as those ventures which have developed incrementally or radically innovative products.

The variable *number of founders* refers to the size of a venture's founder team. It is measured three months after the product development process began. Given that the nascent ventures of our sample rarely had more than 5 founders, this variable distinguishes between 1, 2, 3, 4, and 5 or more founders.

Similarly, the variable *number of employees* refers to the resource endowment of a venture in terms of employees. Akin to the number of founders, the number of employees was determined three months after a venture started its first product development activity.

Control variables

We control for venture characteristics that might influence the linkage formation process of a venture. Even though our overall sample is rather large, the application of clustering methods by definition creates smaller sub-samples. Given its fine-grained nature, our dataset is especially prone to produce small and very specific clusters. As a consequence of the small N in some clusters, we limit the number of control variables to avoid overfitting the regression models and, thus, degrees-of-freedom problems.

We include *industry* as a control, because industries are structurally different and induce ventures to pursue different business models. Different industries may therefore require distinct organizational structures (Sine et al., 2006) and encourage different approaches to new product development. We group ventures into ICT (0) and Renewable Energy (1) ventures. In those few cases where ventures had more than one industry affiliation, we classified their main activity field as the relevant industry affiliation.

As a second control variable, we include *type of good* a venture produces into our models in order to distinguish between ventures developing a tangible product (2), a non-tangible service (0), or a mixture thereof (1). The reason to include this control variable is that the development of tangible products may require different approaches and, thus, external linkages than the development of non-tangible services. Table 5.5 provides a descriptive overview of the independent and control variables included in our analyses.

Thirdly, we control for the institutional setting, or the variety of capitalism (VoC), in which a venture operates. The VoC literature (Hall and Soskice, 2001) assumes that economic interaction is organized differently between countries which, in turn, is shaping the strategies of

economic actors within the economy through a distinct set of institutions. The VoC literature has identified distinct institutional constellations, amongst which liberal market economies (LMEs), coordinated market economies (CMEs), and mixed market economies (MMEs) constitute the most prominent archetypes.

With regard to linkage formation with external partners, the legal system of an economy is considered to influence the choices made by companies. According to the VoC literature (Tate, 2001; Teubner, 2001), the reason for this is that the predictability of the outcome of lawsuits between collaboration partners is influenced by the country's legal system. Against this backdrop, the legal system of CMEs yields the highest degree of predictability which, in turn, should foster the formation of external linkages. Contrary to that, the legal system of LMEs leads to less predictability – as is the case in MMEs where long delays as a result of a dysfunctional legal system induce high levels of unpredictability (Tate, 2001; Teubner, 2001). As a result, nascent ventures in LMEs and MMEs might form fewer external linkages as their counterparts in CMEs.

5.3.3 Econometric model and estimation method

In this paper, we aim to identify the type and order of linkage formation activities during the new product development process and the circumstances driving it. To this end, we proceed in two steps and (1) first use sequence analyses (more concretely optimal matching techniques) to detect the type and order of linkage formation activities during the product development process, and (2) second, we identify the circumstances with the use of binary logistic regression analyses. While we describe both methodological approaches below, we focus on optimal matching techniques because this method – which was also used to decode the human genome – is still novel to, and thus less well known in, business and management studies.

Optimal Matching Techniques

Optimal matching (OM) techniques were originally developed in computer sciences, then applied in natural sciences to analyse for example DNA sequences, and later used in sociology – in particular for analyses of career patterns (Biemann et al., 2012; Dlouhy and Biemann, 2015). Like a career, the new product development process of ventures is made up of single states (in-house development, and development through research and/or market linkages), which together form a sequence (see Table 5.4). This sequence is analysed in a similar way as a DNA sequence, with the states of the new product development process replacing the nucleotides of the DNA as the sequence elements. OM techniques can thus identify the most frequently pursued approaches towards linkage formation during the new product development process, by matching the type and timing of in-house development and linkage formation activities. To this end, the OM algorithm measures the distance between processes (or: sequences of states),

and is subsequently paired with cluster analyses in order to identify “clean” clusters (Halpin, 2010). Compared to other methods like traditional cluster analyses, OM has been found to deliver superior results in identifying patterns in sequence data because OM provides “cleaner” clusters (Biemann and Datta, 2014).

Table 5.5 Descriptives

Variable	Value	N	in %
Product Novelty	Imitative (0)	97	26.22%
	Incremental (1)	202	54.59%
	Radical (2)	71	19.19%
Number of Founders	0	11	2.97%
	1	104	28.11%
	2	119	32.16%
	3	66	17.84%
	4	32	8.65%
	5+	38	10.27%
Number Employees	0	211	57.03%
	1	50	13.51%
	2	35	9.46%
	3	22	5.95%
	4	12	3.24%
Industry	5+	40	10.81%
	ICT (0)	255	68.92%
	RE (1)	115	31.08%
Type of Good	Service (0)	78	21.08%
	Mix (1)	230	62.16%
	Product (2)	62	16.76%
VoC	CME (1)	175	47.29%
	MME (2)	45	12.16%
	LME (3)	150	40.54%

In the context of new venture creation, the first detailed OM application focuses on team formation process (Held et al., 2018). In a more general study on venture creation processes, Gordon (2012) uses OM techniques to sequence gestation activities. Given that more wide-ranging developments and applications of OM algorithms only occurred after the year 2000, OM can still be considered a fairly young method. Nevertheless, a standard way of running sequence analyses, based on OM techniques, has crystallized, which we here follow (Biemann and Datta, 2014). It includes four steps:

Step 1: Coding the Data

The first step consists in reporting the linkage formation process of each venture on a monthly basis. This means that a sequence of linkage formation states, depicting each venture's linkage formation process, needs to be created for each venture (for an example, see Table 5.2). The reported linkage formation process can vary in length for each venture as the length is a result of time that passed between the first product development activity and the end of the venture creation process.

Step 2: Define the Substitution Costs

In order to measure the distance between two linkage formation sequences, created in step 1, a cost needs to be assigned for replacing one state by any other state with the aim of transforming one sequence into the other. These so-called substitution costs range from 0 to an arbitrary maximum (here: 2) and are estimated on the basis of the relative frequency of transitions between two states within the entire dataset. The rationale underlying this approach is that the more often a transition occurs between a pair of states, the more similar the states are (Biemann and Datta, 2014). Based on this transition frequency between any two states, a so-called substitution cost matrix is determined (Held et al., 2018).

Step 3: Calculating Sequence Similarity

Based on these substitution costs, it is then calculated how costly it is to transform each of the 370 sequences in our dataset into any of the other 369 sequences. The cost of transforming one sequence into the other expresses their respective distance to one another. To determine the distance of two sequences that differ in length, we calculate their distance based on the length of the shorter sequence. This reflects that the shorter linkage formation process is unknown beyond the period observed and should thus not influence the distance measure. This novel solution was introduced in Held et al. (2018) and addresses an often voiced concern of using OM for analysing sequences in social science that vary greatly in length (Aisenbrey and Fasang, 2010)

Furthermore, we normalize the respective values of sequence difference by dividing them by the length of the shorter of the two sequences in order to maintain a comparable difference measure across sequence pairs. This results in a matrix which reports the distances between each sequence pair.

Step 4: Perform a Cluster Analysis

In a final step, these new product development processes (including their various linkage formation activities) are clustered on the basis of their respective distances to one another. Consequently, each cluster obtained encompasses those processes that are particularly similar to each other, and distant to the processes of other clusters. Accordingly, each cluster

represents one of the most frequent and, thus, typical approaches to (linkage formation during) new product development. We run the cluster analysis based on the Ward's minimum variance method, which has been shown to consistently produce the most accurate sequence clustering within the framework of OM analyses (Dlouhy and Biemann, 2015).

We use a combination of various partition quality measurements, namely the Weighted Average Silhouette Width (ASWw), R^2 , Point Biserial Correlation (PBC), and Hubert's C (HC) to determine the optimal clustering solution amongst all solutions between one and twenty clusters. These measures indicate how similar sequences are within one cluster and how different they are between clusters. Consequently, we calculated these indicators for one, two, three, etc., up to twenty clusters in order to determine their goodness of fit. In this way, we could determine for which cluster number the goodness of fit is maximized. In doing so, we could exclude those cluster solutions which either did not yield distinct approaches, because they clustered together too different sequences, or which spread out sequences over too many similar clusters. In the end, each cluster can be pictured with a most representative sequence of states (marked with "rep." in Figure 5.1).

Estimations based on Binary Logistic Regressions

Once optimal matching analyses have allowed us to identify the common approaches towards (i.e. the types and order of) linkage formation during new product development, we want to understand "what factors cause the different sequences observed" (Van de Ven and Engleman, 2004, p. 355). We use binary logistic regression models in order to identify the conditions that lead nascent ventures to pursue one rather than the other new product development process (dependent variable). In testing our hypotheses, we research in how far product novelty, the number of founders, employees and, respectively, the shortage thereof (independent variables) are associated with distinct approaches to linkage formation during new product development. We furthermore control for the venture's industry and whether the venture develops a service or rather a tangible good.

We fit the following model for each cluster to obtain the estimates:

$$\ln\left(\frac{p_i}{1-p_i}\right) = \beta_0 + \beta_1 \text{Novelty}_i + \beta_2 \text{Founders}_i + \beta_3 \text{Employees}_i + \boldsymbol{\beta}' \mathbf{x}_i \quad (1)$$

where p_i denotes the probability that venture i belongs to the cluster rather than to any of the other clusters, β_0 the cluster's intercept, β_1 , β_2 , and β_3 the estimated coefficients for our independent variables, $\boldsymbol{\beta}$ a vector of coefficients for the control variables, and \mathbf{x}_i a vector of control variables.

5.4 RESULTS

5.4.1 Patterns in New Product Development Processes

In the first part of our analysis, we explore the type and order of (and thus the variety of approaches towards) linkage formation activities during the new product development processes of nascent ventures. To this end, the algorithm 'optimally matches' sequences on a monthly basis, which allows us to gain a fine-grained picture of the precise linkage patterns during new product development processes. These optimal matching analyses reveal four clusters and, thus, four distinct sequences or approaches towards product development, namely: (1) in-house development only, (2) in-house development in parallel with external research linkages (3) in-house development followed by product development through external market linkages, (4) in-house development in parallel with external market linkages. This solution combines the partition quality measurements better than any other considered solution (ASWw = 0.69; $R^2 = 0.73$; PBC = 0.77; HC = 0.09).

Figure 5.1 provides an overview of these four clusters, whereby the x-axis of each cluster is a timeline on the basis of months, while the y-axis reports the product development process (sequences of states) pursued by each venture within that cluster. Accordingly, cluster 1 (IH) includes 266 processes, while cluster 2 (IH & RL) includes 41 processes. The clusters characterized by market linkages are smaller with 28 processes in cluster 3 (IH / ML) and 35 in cluster 4 (IH & ML). Most importantly, the bar underneath each cluster reports the most representative approach ('Representative Sequence') of each cluster.

Interestingly, and contrary to the exploration-exploitation literature on how ventures make use of new knowledge (Burgers et al., 2008; Lee et al., 2010; Rothaermel and Deeds, 2004), hardly any nascent venture develops its product with external partners first through research and then through market linkages. If they do not develop their products exclusively in-house (see the most representative sequence bar of cluster 1 (IH)), virtually all nascent ventures form *either* external research linkages (cluster 2 (IH / RL)) *or* external market linkages (after completing, or in parallel to, in-house product development – see the approaches of clusters 3 (IH / ML) and 4 (IH & ML)).

When we look at these four distinct approaches towards new product development in more detail, it is noteworthy that the most common process, by far, consist in-house product development (cluster 1 (IH)). Overall 266 – and thus 71.9% of – nascent ventures within our sample pursue this new product development process. As illustrated by the "most representative sequence" bar, these ventures refrain from forming external linkages. Amongst all four approaches to new product development, pure in-house development is, by far, the shortest one as ventures take on average 10 months to develop a functional prototype.

Nascent ventures in the smaller cluster 2 (IH & RL, n = 41; 11.08% of the sample) run in-house development in parallel to entering research linkages throughout the product development process. In addition, our analysis uncovers the existence of two additional approaches to new product development, both of which combine in-house product development with the formation of market linkages (cluster 3 (IH / ML), cluster 4 (IH & ML)).

Ventures in cluster 3 (IH / ML, n = 28; 7.6% of the sample) also begin the process of developing their new product in-house but start creating market linkages between months 6 and 12. Around the same time the ventures finish the respective in-house development of their product. In other words: We observe a clear two-step sequence of first developing the product in-house and then ensuring its market fit.

A different pattern emerges in Cluster 4 (n = 35; 9.5% of the sample). Here the nascent ventures enter into market linkages in parallel to developing their new product in-house. While the linkage formation activities are the same, the two approaches differ in the timing and, thus, type and order of product development activities. Interestingly, parallel in-house and market-linkage development enables nascent ventures to complete product development activities after 16 months and, thus, takes less time than sequential in-house and market-linkage development, where product development activities go on until month 22.

In sum, we can observe that nascent ventures have a clear preference for first developing products in-house and to subsequently either establish research or market linkages. These findings shed new light on the exploration-exploitation literature which, to date, mostly argues that ventures engage in both: first research and then market linkages in order to develop their new products.

5.4.2 Circumstances of External Linkages in New Product Development Processes

Having identified how the most frequent processes of new product development in nascent ventures look like, we want to understand which factors determine each process: What makes nascent ventures pursue one rather than the other processes? To answer this question, we use binary logistic regressions to compare the characteristics of ventures in one cluster with those of the other clusters in order to determine in how far cluster membership is correlated with particular venture characteristics (Table 5.6).

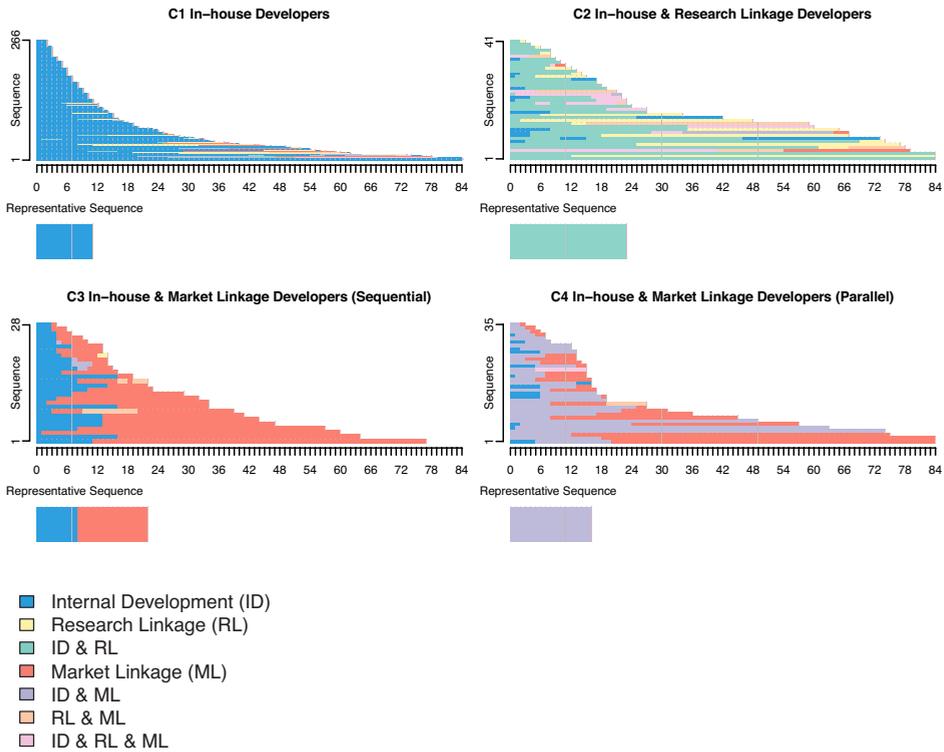


Figure 5.1 Patterns of Linkage Formation Activities in Product Development Processes

In Hypothesis 1 (H1) we predicted that innovative ventures are more likely to form first research linkages and then market linkages to external partners. We find partial empirical support for the hypothesis. Innovative ventures are highly unlikely to develop new products exclusively in-house, which is true for both incrementally (IH; $\text{Exp } \beta = .387$; $p < .05$) as well as radically innovative ventures (IH; $\text{Exp } \beta = .517$; $p < .05$). Furthermore, and as expected in the first part of H1, incrementally innovative ventures form research linkages in parallel to in-house product development (IH & RL; $\text{Exp } \beta = 25.719$; $p < .01$). Similarly, radically innovative ventures tend to form research linkages in parallel to developing their product in-house (IH & RL; $\text{Exp } \beta = 9.365$; $p < .01$). However, contrary to the final part of H1, neither incrementally nor radically innovative ventures form market linkages. On the contrary, incrementally innovative ventures are significantly likely not to do so (IH & ML, $\text{Exp } \beta = 0.218$; $p < .1$). Market-linkages thus play a minor role in the development of incrementally or radically innovative products. In sum, the product novelty of nascent ventures leads the latter to seek external research rather than market linkages in parallel to a period of in-house product development. This in turn, lends only partial empirical support for Hypothesis H1.

Table 5.6 Circumstances of Linkage Formation during New Product Development Processes (Binary Logistic Regressions)

Variable	New Product Development Process (Exp β)			
	IH	IH & RL	IH / ML	IH & ML
Degree of Novelty				
- Incremental	.387**	25.719***	1.281	.218*
- Radical	.517**	9.365***	.747	1.232
Number Founders	.939	1.181	1.191	.854
Number Employees	.866**	.936	1.273**	1.199*
Renewable Energy Ind.	.352***	4.076***	1.625	1.851
Type of Good				
- Mix	1.283	1.853	.164***	2.441
- Product	1.490	1.428	.201**	2.360
VoC				
- LME	.994	.437**	1.632	1.385
- MME	.921	.733	.818	1.932
Intercept	7.269***	.005	.093***	.037***
Observations in Cluster	266	41	28	35
Observations in Analysis	370	370	370	370
R ²	.103	.219	.146	.097

p-values *** < .01, ** < .05, * < .1

The second hypothesis (H2) which predicts that nascent ventures with more employees are likely to first develop a new product in-house and then form external market linkages is strongly confirmed. The more employees are employed, the more likely ventures are to form external market linkages straight-away next to in-house product development (IH & ML; Exp. β = 1.199; p < .1) or after the in-house product development (IH / ML; Exp. β = 1.273; p < .05). Taken together, we thus find empirical support for hypothesis H2.

Our third hypothesis (H3) predicts that nascent ventures, which are highly constrained in their human resources, are more likely than resource-rich ventures to develop their product solely in-house, because they lack fundamental opportunities to form external linkages. Indeed, our findings reveal that resource-scarce ventures tend to develop in-house, i.e. refrain from building up external linkages during the new product development process. This is particularly true for nascent ventures with few employees (IH; Exp. β = .866; p < .05). While the same effect holds for ventures with few founders, this effect is not significant (IH; Exp. β = .939; p > .1). The finding that the human-resource scarcity of nascent ventures forecloses the opportunity to form external linkages is noteworthy, because linkages built to external partners during the development

process of new products have been associated with a variety of positive outcomes (Hoang and Rothaermel, 2010; Nieto and Santamaría, 2007; Rothaermel, 2001). Hence, human-resource scarcity seems to be a major barrier which hinders resource scarce ventures to search for and build external linkages.

Not surprisingly, the control variables also influence which approach to new product development is chosen by nascent ventures. Accordingly, we find that nascent ventures developing pure services are significantly more likely than pure product developers, or ventures developing products with a service component, to first develop their new service exclusively in-house before forming market linkages (IH / ML; Exp $\beta = .201$; $p < .05$). In addition, we find that the linkage formation activities of nascent ventures vary depending on the industry in which they are active. While ICT ventures are significantly more likely than alternative energy ventures to develop their new products exclusively in-house (IH; Exp $\beta = .352$; $p < .01$), they are significantly less likely to engage in any research linkages in parallel to in-house development (IH & RL; Exp $\beta = 4.076$; $p < .01$). Concerning the institutional framework of ventures, we find – in line with the expectations of the VoC literature – that a research linkage heavy approach to the new product development process is less than half as likely to occur in LMEs than in CMEs (IH & RL; Exp $\beta = .437$; $p < .05$).

5.5 DISCUSSION AND CONCLUSIONS

Our study of when, how, and why nascent ventures form linkages to external partners during the new product development process allows us to make major empirical and theoretical contributions. These contributions were enabled by the use of a method that is still highly novel within business and management studies: sequence analyses based on optimal matching techniques. By comparing entire product development processes rather than individual data points at given moments in time, this fine-grained analysis makes it possible to identify four product development processes that are typically pursued by nascent ventures. For each approach, we show when and in which order research or, respectively, market linkages were formed, and under which conditions nascent ventures refrain from external linkage formation.

Our study contributes to the sparse knowledge regarding the relationship between the formation of external linkages of nascent ventures for the purpose of new product development and the venture characteristics driving it (Ahuja, 2000; Almeida et al., 2003; Eisenhardt and Schoonhoven, 1996; Paier and Scherngell, 2010). With the exception of Eisenhardt & Schoonhoven (1996), our study is the first one which combines strategic and firm-level opportunity-based explanations for external linkages formation in processes of new product development. Relating the resource-based view of strategic needs (Eisenhardt and Schoonhoven, 1996; Glaister, 1998; Ireland et al., 2002) to the stage model of sequential exploration-exploitation linkages (Burgers et al., 2008; Lee et al., 2010; Rothaermel and Deeds, 2004), we find that innovative ventures form research linkages (in parallel to in-house product development) significantly more often than non-innovative ventures. Importantly, though, innovative nascent ventures do not form market linkages. This result is surprising and indicates that even nascent ventures with the strategic need to develop external linkages may, simply, not have sufficient resources to form both research as well as market linkages.

Following Eisenhardt & Schoonhoven (1996), we further argued that the resources of a venture provide not only the strategic need, but also the opportunities for linkage formation. Indeed, we find that the amount of the existing knowledge base – the most important resource in the view of the resource-based theory – shapes which linkages are chosen. Ventures with more employees exploit their operational competence by forming mostly market linkages. Taken together, these findings indicate that their particular resource scarcity drives nascent ventures to focus on only one type of external (research or market) linkages – either driven by strategic needs, or by their firm-level opportunities.

We furthermore found that the human resources of a venture, which provide the opportunities for linkage formation, are relevant in a very basic sense: While ventures with more founders and employees have the opportunity to enter linkages, human-resource scarce ventures do not have

this opportunity. Put it differently: Scarce firm-level resources translate into scarce firm-level opportunities for external linkage formation. A venture's size can therefore be considered a fundamental determinant of the opportunity to form linkages at all. This finding is particularly surprising in view of the large number of nascent ventures in our sample that did indeed not form any external linkages. While external linkages substantially increase a firm's competitiveness (Hoang and Rothaermel, 2010; Nieto and Santamaría, 2007; Rothaermel, 2001), the resource scarcity of nascent ventures constitute a significant barrier to create these linkages. The opportunity costs of ventures, which are underequipped with human resources, seem to be often higher than from what could be gained from external linkages. This finding supports earlier work of Ahuja (2000) which is, to our best knowledge, the only work that has taken the role of opportunity costs in building up linkages into account. Given the rich literature on the value that external linkages create for new ventures (Hoang and Antoncic, 2003; Hoang and Rothaermel, 2010; Nieto and Santamaría, 2007; Rothaermel, 2001), this finding is important as it suggests that more research is needed to better understand the circumstances hindering entrepreneurs to search for external linkages. This paper can be understood as a first attempt to this end.

In interpreting the results of this study, certain limitations must be kept in mind. First and most importantly, the identification of clusters implies that we subdivide our dataset and run regression analyses on comparatively small groups of ventures. An even larger number of cases would be desirable to statistically enable the inclusion of more independent variables into the respective regression analyses. We leave the possibility of an analysis involving larger subsamples for future research. Second, we showed that a small human-resource basis reduces the opportunities of nascent ventures to form linkages. Others have argued that the causality is reverse, i.e. that size is an outcome, not a predictor for linkages (Powell et al., 1996). Indeed, our dataset does not allow us to test for causality. However, our argument follows prior research which explicitly took causality into account, concluding that a reciprocal association cannot be identified (Shan et al., 1994). That said, there certainly is a need to better understand the relationship between linkage formation and the circumstances driving it.



CHAPTER 6

Conclusions

6.1 MAIN CONTRIBUTIONS

This thesis sets out to shed more light on the venture creation process and, more specifically, to advance our understanding of how it plays out over time. Long after establishing that entrepreneurship in general, and venture creation in particular, are processes rather than singular acts, entrepreneurship research still struggles to establish a cohesive model of the venture creation process and its sub-processes. In order to overcome this problem, my thesis addresses the following two research questions in chapters 2 to 5.

1. *Do the activities undertaken throughout the venture creation period manifests themselves in a single, uniform process, in a distinct number of processes, or in an entirely random way?*
2. *To the extent that distinct processes of venture creation can be identified, what factors then explain that one rather than another process is pursued?*

Each chapter in this thesis draws on different literature strands in order to answer these research questions regarding a specific sub-process of venture creation. In turn, each chapter contributes to the respective literature strand. After outlining the specific contributions made by each chapter and the overall thesis, I highlight the methodological contribution I make with this thesis, before I reflect on the limitations of my research. In the concluding section of this chapter I offer ideas about how future research can overcome these limitations and build on the findings of this thesis.

6.2 LITERATURE

In chapter 2, I study the entry process of entrepreneurs and their choice between part-time and full-time entrepreneurship. This choice is viewed as a real options choice. Hereby, I contribute to a growing body of literature which recognizes that the entry choice is not a binary one between full-time entry and no entry. This literature recognizes that entering entrepreneurship on a part-time basis is a viable third option. The chapter's main contributions to this literature are threefold. First, I extend the literature by showing that the choice between the entry options is not only driven by the characteristics of the entrepreneur herself or her immediate environment, but also by characteristics of the venture, such as venture team composition and industry, and the institutional environment. Thereby, I answer calls in the part-time entrepreneurship literature for deepening our understanding of how venture characteristics influence an entrepreneur's choice between an entry to entrepreneurship in part-time or full-time (Raffiee and Feng, 2014). The influence of the institutional setting comes particularly to the fore in the second noted contribution I make with this chapter, namely, analysing which factors influence the transition behaviour of part-time entrepreneurs. I find that, consistent with the Varieties of Capitalism literature (Hall and Soskice, 2001), part-time entrepreneurs in coordinate market economies (such as Germany) are significantly less likely to transition to full-time entrepreneurship than those in liberal market economies (such as the UK and the US). In showing that the individual entry behaviour of entrepreneurs is influenced by the institutional setting, I extend the emerging 'Varieties of Entrepreneurship' literature (Dilli et al., 2018; Herrmann, 2019). I do so by showing that intuitions not only elicit the emergence of a dominant type of entrepreneurship (Dilli et al., 2018), but also of specific entry choices by the entrepreneur herself. The third contribution I make in this chapter is to distinguish, for the first time, between entrepreneurs who are original entrepreneurs, i.e. entrepreneurs who create a venture from scratch, and those entrepreneurs who join a venture that already exists for more than three months. I find that these groups differ significantly in their entry choices. Original entrepreneurs are more likely than their counterparts to choose part-time entry in their initial entry choice. In the subsequent transition choice, part-time entrepreneurs who are original entrepreneurs are more likely to transition to full-time entrepreneurship than those who joined an existing venture. This finding adds to the literature that conceptualizes the entrepreneurial entry as a real options choice (Folta et al., 2010; O'Brien et al., 2003; Wennberg et al., 2006) in which uncertainty plays a decisive role: I argue that the additional information joining founders have about the value of the entrepreneurial opportunity, reduces their incentive to reduce uncertainty through a part-time entry.

Having analysed the entry processes of individual entrepreneurs in chapter 2, we shed light on the team formation process at the venture level in chapter 3. We employ a definition of the venture team that goes beyond the founders involved in the creation of the venture and encompasses employees and external service providers. This reflects a development in the literature on

human capital in nascent ventures, that, in addition to the founders, also employees and even external service providers can form a crucial source of human capital in the creation of a venture (Cardon and Stevens, 2004; Koch et al., 2013). As a result of this broader conceptualization of team formation, we not only describe the seven most prevalent team formation processes with regard to the founder team, but also uncover that distinct approaches to the hiring of employees and service providers exist. We show that significant interaction occurs between the approaches to these three components of the venture team. An additionality effect exists between founder team size and the hiring of employees, whereas we observe substitution effects between the hiring of employees and service providers. The reliance on service providers is especially prevalent amongst nascent ventures in coordinated market economies. This finding is in line with the expectation of the Varieties of Capitalism literature that coordinated market economies elicit small-scale growth (Dilli et al., 2018; Herrmann, 2019, 2008). As such, we confirm that mechanisms introduced in the Varieties of Capitalism literature, originally developed in the context of established firms (Hall and Soskice, 2001), also apply to nascent ventures - at least with regards to aspects of the team formation.

In chapter 4, we investigate which funding acquisition processes commonly occur amongst nascent ventures. We draw on two theoretical frameworks, namely the Pecking Order Theory (Berger and Udell, 2006, 1998; de Bettignies and Brander, 2007; Michaelas et al., 1999) and the financial bootstrapping literature (Bhide, 1992; Lam, 2010), that propose contradictory arguments about the funding acquisition approaches of nascent ventures. In this chapter we make a first step towards unifying the two strands of literature on venture funding by illustrating under which circumstances each of these literature strands provides valuable insights into the funding acquisition of nascent ventures. We detail that seven distinct processes of funding acquisition are regularly followed by nascent ventures. The majority of ventures follows one of two processes that fit the expectations formulated in the financial bootstrapping literature. These nascent ventures rely almost exclusively on the funding of their founders (Winborg and Landström, 2001). Therefore, the chapter allows us to conclude that the financial bootstrapping literature adequately describes the funding acquisition process of the majority of nascent ventures. However, a small, yet significant number of ventures deviate from this process. These ventures acquire funding from other sources than their founders. The type of funding a venture acquires correlates with various venture characteristics such as the type of good that it develops, the product's novelty, venture size and the venture's industry. More specifically, we show that ventures which hire employees at the beginning of the funding process typically acquire debt and external equity after, or in parallel to, relying on the investment from their founders. Similarly, innovative ventures are likely to acquire external funding in the form of grants or external equity, while debt is most commonly acquired by ventures which produce tangible goods. These findings are largely in line with the expectations formulated in the pecking order theory on how a venture's funding needs and ability to signal quality influence the types of

funding it acquires (Frid, 2009). We thus find that the propositions of the pecking order theory apply to a minority of ventures – namely those that hire employees, market a tangible product or develop an innovative product. In summary, we offer a more realistic picture of prominent funding acquisition processes and clarify for which type of ventures the financial bootstrapping theory, respectively, the pecking order theory contribute to a better understanding of funding acquisition processes.

In chapter 5, we present our findings on patterns in the new product development process of nascent ventures. The optimal matching analysis reveals four distinct approaches to linkage formation throughout the new product development process. The most wide-spread process is one followed by ventures that develop their product exclusively in-house. We find that particular resource-scarce ventures are more likely to follow this approach. Contrastingly, those ventures which focus on market linkages in their new product development are more likely to employ a higher number of workers, whereas those investing into research linkages develop especially novel products. Relating these findings to the organizational learning literature (March, 1991; Rothaermel and Deeds, 2004), we find that none of the patterns discovered is in accordance with the general expectation formulated in this literature. This literature generally assumes that firms form both types of linkages and do so in a distinct sequence: that is, they first form research linkages and then exploit the developed product through market linkages (Burgers et al., 2008; Rothaermel and Deeds, 2004). We conclude that nascent ventures, at least initially, either do not have sufficient incentives or not enough resources to form external linkages at all or have to limit themselves to pursuing just one of type of linkages throughout the new product development process. This insight speaks to the large body of literature which assumes external linkages to have a significant positive impact on ventures (Hoang and Antoncic, 2003; Hoang and Rothaermel, 2010; Nieto and Santamaría, 2007; Rothaermel, 2001) and points to resource limitations and opportunity costs as important, yet overlooked, impediments to the formation of external linkages amongst nascent ventures.

Summarizing these finding and answering the first overarching research question of this thesis, I can firmly conclude that the venture creation process neither plays out in one uniform process, nor in a random order. Instead, I observe a limited number of distinct sub-processes that ventures follow to acquire the most crucial resources required to further their development. The observed processes differ in terms of sequence of activities, process length, and whether (or not) a process is static or transitions between different states. Importantly, this finding holds for all three sub-processes I analyse.

Notably, the most common type of process found in each sub-process is one that can be characterized as 'stasis' - reflecting a minimal amount of resource acquisition throughout the course of venture creation. With regard to team formation, this translates into a process driven

by one founder who does not hire service providers or employees. The most common funding acquisition process is one in which the venture receives funding exclusively from its founders, while the new product development process is more often than not carried out without tapping into external resources. Therefore, the baseline for the creation process of nascent ventures is one that chiefly relies on the labour, financial, and knowledge resources of the founder or founder team. This provides empirical support for the bootstrapping literature which describes how nascent ventures rely on leveraging the human capital, funding and knowledge of their founders to acquire further resources (Grichnik et al., 2014).

However, and in answer to the second overarching research question posed, I observe that ventures with certain characteristics, or operating under certain institutional frameworks, significantly deviate from this process and broaden their human, financial, and knowledge resources. Across the three resource acquisition processes I have analysed, I find that the degree of innovativeness of the product a venture develops, as well as a venture's industry consistently influence which venture creation process is chosen.

Furthermore, I have shown that, throughout the venture creation process, both, the choices of the individual entrepreneur and the development of the venture itself, vary within different institutional frameworks. Venture creation processes do not play out in a vacuum: Under different institutional frameworks entrepreneurs favour different venture creation processes to solve the coordination problems they face when creating a venture. This finding connects seamlessly to the recently emerging and growing literature on a 'Varieties of Entrepreneurship' (Dilli et al., 2018; Herrmann, 2019) that describes how institutions shape different forms of entrepreneurship.

These findings extend the existing research on venture creation processes in two ways. First, this thesis describes patterns in sub-processes of venture creation in greater detail than previous work (see Carter et al., 1996; Gordon, 2012). Second, I show that we need to take various characteristics of ventures and the venture's context into account if we want to advance our knowledge of typical venture creation processes (see Liao and Welsch, 2008; Samuelsson and Davidsson, 2009). In other words, finding one universal venture creation process seems unlikely. Instead, and building on this thesis, identifying distinct venture creation processes for distinct types of ventures is a worthwhile goal.

6.3 METHOD & DATA

In addition to the contribution made to the literature strands mentioned above, this thesis aims to make a methodological contribution to organizational process research in general, and entrepreneurship process research in particular. Chapters 3-5 employ optimal matching techniques to demonstrate the method's usefulness in analysing organizational development processes. As described in greater detail in the introduction of this thesis, a modification of optimal matching was developed as part of this thesis to advance the use of optimal matching for the exploration of social processes of unequal lengths. This advancement of the method allows researchers to use the maximum amount of available and comparable information in the similarity calculation of processes, while avoiding to distort the temporal aspect of the processes through inserting or deleting states (Aisenbrey and Fasang, 2010; Lesnard, 2010).

For each of the researched sub-processes of the overall venture creation process, a number of distinct processes is identified. These representative processes fill a gap in the study of entrepreneurial processes. Existing process research either observes process input and outcome variables (Davidsson and Honig, 2003; Dimov, 2010) or describes a few venture creation processes in detailed cases studies (Reymen et al., 2015; Van de Ven et al., 1989). The method introduced in this thesis thus allows for the first time, to identify and describe the most common sub-processes of venture creation within a larger population of ventures in a systematic and quantitative manner.

The fact that we are able to find distinct sub-processes within the overall venture creation process, shows that optimal matching techniques can make a valuable contribution to organizational science when paired with appropriate data. The dataset collected as part of this thesis project provides a valuable blueprint for how a dataset can be designed for the purpose of running optimal matching analyses. The dataset's explicit focus on tracking activities over time in the form of time stamped data, rather than registering singular activities has proven to produce the type of data optimal matching analyses require to deliver meaningful results to venture creation research.

6.4 LIMITATIONS

Despite these theoretical and methodological contributions, this thesis is not without its limitations. First of all, the nature of data collected needs to be discussed. The data covers the creation processes of ventures in only two industries. As this thesis has shown, a venture's industry can significantly influence which venture creation processes are routinely followed. Therefore, it would be a welcome extension of this thesis to replicate the study for ventures in other industries in order to analyse more systematically which industry characteristics are especially prominent in shaping commonly found venture creation processes.

Similarly, a broadening of the dataset - to include more than the five countries that are currently covered would allow researchers to deepen our knowledge about how the venture creation process plays out across different countries. This is especially relevant for those interested in the contribution this thesis makes towards the "Varieties of Entrepreneurship" literature (Dilli et al., 2018; Herrmann, 2019). For the purpose of this thesis I rely on country level dummies to establish within which variety of capitalism a venture is created. Increasing the number of countries in the dataset would allow researchers to move from this rather coarse measure of the institutional framework to more precise indicators of specific institutional aspects, such as the strength of employment protection and levels of trust - to mention just two factors affecting the venture creation process.

As the reader may have noticed, neither of the chapters pays attention to outcome measures of venture creation processes such as success. This is partly a conscious choice, as the focus of this thesis is to explore and describe the variance in venture creation processes, and partly owed to the fact that the data collected has limitations in this regard. As are other samples of nascent ventures, our sample is potentially subject to a survival bias. This bias can emerge because founders of still existing venture are easier to reach and are potentially more willing to provide information on their venture than founders who had to dissolve their venture (see Gartner and Shaver, 2012). The generalizability of my findings might be affected by such a survival bias.

In terms of financial success, the dataset provides information on the amounts of turnover and profit a venture made. This information is recorded at specific points in the venture creation process, namely in the month a venture first reaches profitability, as well as three and twelve months after this first profitable month. Of course, not all ventures reach profitability in the same month of their existence. From this follows, that the exact month of the venture creation process in which the financial indicators are recorded also differs per venture. If, for example, one venture reached profitability in month three of its existence, we know how much profit it made in month three of the process. If another venture generated its first profits only in month 24 of the process, the data for this venture accordingly provides information on how much profit

was generated in month 24 after the creation of the venture began. This makes comparing these financial indicators across ventures more difficult. While knowing how long it takes a venture to reach profitability is a relevant success indicator in itself, this information might be supplemented in future studies by measuring financial success at points in time relative to the beginning of the venture creation. An example would be to record the generated profit and turnover six months, one and two years after the beginning of the venture creation process. Recording these measures relative to the beginning of the process would increase the comparability of financial success measures across ventures.

Besides these data related limitations, the method employed throughout chapters 3-5 is subject to a number of limitations. The first two steps of this analysis consist of (1) the calculation of the distance between every pair of venture creation processes and (2) the clustering of all sequences in such a way, that the distances within a cluster are minimized and maximized between clusters. The outcome of these two steps is a number of clusters that each represent a distinct process. Therefore, the outcome of the two steps is largely of a descriptive and explorative nature. In order to learn more about the circumstances under which each process is the most likely to occur, I run a regression analysis in which cluster membership serves as the dependent variable. While this sheds light on the circumstances that surround the emergence of certain types of processes, it does not allow the inference of causal links. Importantly, this limitation is inherent to all regression analyses and thus not unique to my particular approach. But given that the process in its entirety forms the dependent variable in the respective regression analysis, it is not straightforward to relate independent variables to specifics within the process. It is, for example, difficult to formulate and test hypotheses that relate to the point in time when a transition within a process occurs. Using the process in its entirety as the dependent variable introduces another issue: How do we measure the influence of independent variables that change throughout the process? In view of the complexity of the analyses presented in my thesis, I decided to rely on static measures and measuring dynamic measures at the very start of the process to mitigate this problem – leaving the integration of dynamic measures to future research.

6.5 NEXT STEPS IN RESEARCH ON THE VENTURE CREATION PROCESS

One of the key contributions of the thesis is, to unpack the venture creation process into three sub-processes and investigate each of them separately. The logical next step would be to theorize and investigate how the sub-processes interact with each other. Merging them into one overall process and analysing this more complex process constitutes another obvious and promising avenue for further research. For the purpose of this thesis I have focussed on the acquisition of a single type of resource per chapter and framed the findings within the resource-based view. The resource based view however, has a rather static view regarding the assembly of a venture's resources (Eisenhardt and Martin, 2000). Researchers who aim to explore the dynamic interaction between the three resource acquisition processes therefore might want to consider moving towards a theoretic framework that captures how a venture re-configures its resources base over time. The dynamic capabilities concept (Teece et al., 1997), which was developed as an extension of the resource based view to investigate exactly this type of question (Eisenhardt and Martin, 2000), lends itself well to explore the creation of ventures – a setting dominated by rapid change rather than rigid routines (Zahra et al., 2006).

However, I do caution that considering all three sub-processes in one optimal matching analysis is not without challenges. If one considers that a venture can take on between 6 and 8 states in each of the three sub-processes, the number of possible states in one aggregated process multiplies. Calculating the substitution costs for such a large number of states requires the observation of a large number of processes to arrive at a realistic estimation of how common the transition from each state to another state is. Therefore, researching the interaction between the sub-processes probably requires a significantly larger sample size to arrive at meaningful process clusters. The same reasoning holds for investigating any of the three subprocesses in greater details. It would, for example, be desirable to distinguish between the different sources of debt within the funding acquisition process. However, in order to be able to cope with the increased number of possible states this distinction would induce, optimal matching requires a larger sample size than the one used in this thesis.

The findings presented in this thesis can hopefully inspire researchers of other fields or subfields of entrepreneurship research to integrate the process perspective fruitfully into their work. I would like to suggest a couple of research strands that might benefit from the approach taken in this thesis.

As pointed out in chapter 2, part-time entrepreneurship is an empirical phenomenon that plays an increasingly important role as an occupational choice in the more flexible labour markets of Western countries, such as Germany (Metzger, 2014). With the emergence of gig work as an

even more flexible work arrangement and an area in which the line between entrepreneurship and wage work increasingly blurs (De Stefano, 2015; Kane, 2016), chapter 2 can provide an interesting starting point for comparing the entry and transition behaviour of gig workers with that of entrepreneurs. In this context, the likelihood of a part-time or full-time entry to gig work, as well as identifying the personal characteristics that inform the decision to enter traditional wage work, gig work, entrepreneurship or a combination thereof, all are worthwhile questions to explore. Can gig work serve as a stepping stone towards entrepreneurship or is it merely a very flexible work arrangement?

Furthermore, it seems beneficial to link the research presented in this thesis to literature strands that focus on the context in which a venture or founder is embedded. The context might greatly influence the ease with which a venture can acquire certain resources and how the venture creation process takes shape. Three strands of literature that specifically come to mind in this context: The literature on start-up incubation, entrepreneurial ecosystems and geographic clusters.

Although a wide range of different incubation programs exist globally (Aernoudt, 2004), there is general consensus that one of the main tasks of start-up incubators is to provide ventures with tangible resources, access to a network and training (Eveleens et al., 2017). Beyond providing access to these different forms of resources, incubators also intervene to varying degrees in the venture creation process, in order to encourage certain practices and to potentially streamline the venture creation process (Cohen et al., 2018; van Weele et al., 2017). An intriguing question to explore is therefore, whether incubator selection criteria, access to resources and incubator interventions encourage the emergence of different, potentially more uniform, venture creation processes amongst ventures in incubation programs than the processes described in this thesis. Applying the method I used in this thesis, one could furthermore analyse whether different incubator approaches produce different venture creation processes and which incubator mechanisms elicit larger degrees of uniformness in venture creation. Conversely, incubators might profit from selecting a venture based on its approach to venture creation in order to ensure an optimal fit with their incubation program.

Similar questions can be explored even if a venture and its founders are not part of an incubation program but are embedded in an entrepreneurial ecosystem or a cluster of specialized firms. While both constructs focus on a different unit of analysis, the entrepreneur in the case of entrepreneurial ecosystem and the firm in the case of clusters, they have in common that they research the (regional) business context in which an entrepreneur creates a venture (Stam, 2015). The literature on clusters highlights that being part of a cluster allows ventures to access a specialized workforce (Glaeser and Kerr, 2009), cutting edge knowledge and other resources crucial for the creation of a venture (Delgado et al., 2010; Rocha and Sternberg, 2005;

Spigel and Harrison, 2018). In addition, the entrepreneurial ecosystem literature stresses, how entrepreneurs can profit from the knowledge amassed about the entrepreneurial process by experienced entrepreneurs and role models in an ecosystem (Spigel and Harrison, 2018; Stam, 2015). In summary, either concept describes how the embeddedness within an ecosystem or cluster changes how and what resources a venture can acquire. How this affects the creation of ventures and whether differences exist between embedded and non-embedded ventures, as well as between venture creation processes across different ecosystems or clusters can be explored using the methods and concepts introduced in this thesis. Such studies would tell us more about the effect of ecosystems and clusters on venture creation processes. In addition, they can also inform policy makers which characteristics in an ecosystem or cluster should be fostered to encourage certain types of entrepreneurship.

In conclusion, intriguing questions around the venture creation process remain unanswered. This thesis hopefully provides a stepping stone on which future research can build to answer these questions and encourages entrepreneurship researchers to reap the benefits that non-traditional research methods have to offer to process research.



REFERENCES

REFERENCES

- Abbott, A., Hrycak, A., 1990. Measuring Resemblance in Sequence Data: An Optimal Matching Analysis of Musicians' Careers. *Am. J. Sociol.* 96, 144–185. <https://doi.org/10.1086/229495>
- Abbott, A., Tsay, A., 2000. Sequence Analysis and Optimal Matching Methods in Sociology. *Sociol. Methods Res.* 29, 3–33. <https://doi.org/10.1177/0049124100029001001>
- Abel, A.B., Dixit, A.K., Eberly, J.C., Pindyck, R.S., 1996. Options, the value of capital, and investment. *Q. J. Econ.* 111, 753–777.
- Abernathy, W.J., Clark, K.B., 1985. Innovation: Mapping the winds of creative destruction. *Res. Policy* 14, 3–22. [https://doi.org/10.1016/0048-7333\(85\)90021-6](https://doi.org/10.1016/0048-7333(85)90021-6)
- Aernoudt, R., 2004. Incubators: Tool for Entrepreneurship? *Small Bus. Econ.* 23, 127–135. <https://doi.org/10.1023/B:SBEJ.0000027665.54173.23>
- Ahuja, G., 2000. The duality of collaboration: inducements and opportunities in the formation of interfirm linkages. *Strateg. Manag. J.* 21, 317–343. [https://doi.org/10.1002/\(SICI\)1097-0266\(200003\)21:3<317:AID-SMJ90>3.0.CO;2-B](https://doi.org/10.1002/(SICI)1097-0266(200003)21:3<317:AID-SMJ90>3.0.CO;2-B)
- Aisenbrey, S., Fasang, A.E., 2010. New Life for Old Ideas: The Second Wave of Sequence Analysis Bringing the Course Back Into the Life Course. *Sociol. Methods Res.* 38, 420–462. <https://doi.org/10.1177/0049124109357532>
- Akerlof, G.A., 1970. The Market for Lemons: Quality Uncertainty and the Market Mechanism. *Q. J. Econ.* 84, 488–500.
- Aldrich, H.E., 2001. Who Wants to Be an Evolutionary Theorist? Remarks on the Occasion of the Year 2000 OMT Distinguished Scholarly Career Award Presentation. *J. Manag. Inq.* 10, 115–127. <https://doi.org/10.1177/1056492601102004>
- Aldrich, H.E., Fiol, C.M., 1994. Fools Rush in? The Institutional Context of Industry Creation. *Acad. Manag. Rev.* 19, 645–670. <https://doi.org/10.5465/AMR.1994.9412190214>
- Aldrich, H.E., Ruef, M., 2006. *Organizations Evolving*, Second Edi. ed. Sage Publications Ltd. <https://doi.org/10.1017/CBO9781107415324.004>
- Alic, J.A., 2001. Postindustrial technology policy. *Res. Policy* 30, 873–889. [https://doi.org/10.1016/S0048-7333\(00\)00162-1](https://doi.org/10.1016/S0048-7333(00)00162-1)
- Almeida, P., Dokko, G., Rosenkopf, L., 2003. Startup size and the mechanisms of external learning: increasing opportunity and decreasing ability? *Res. Policy* 32, 301–315. [https://doi.org/10.1016/S0048-7333\(02\)00101-4](https://doi.org/10.1016/S0048-7333(02)00101-4)
- Alvarez, S.A., Barney, J.B., 2001. How entrepreneurial firms can benefit from alliances with large partners. *Acad. Manag. Perspect.* 15, 139–148. <https://doi.org/10.5465/ame.2001.4251563>
- Amason, A.C., Shrader, R.C., Tompson, G.H., 2006. Newness and novelty: Relating top management team composition to new venture performance. *J. Bus. Ventur.* 21, 125–148. <https://doi.org/10.1016/j.jbusvent.2005.04.008>
- Amit, R., Muller, E., Cockburn, I., 1995. Opportunity costs and entrepreneurial activity. *J. Bus. Ventur.* 10, 95–106.
- Andries, P., Czarnitzki, D., 2014. Small firm innovation performance and employee involvement. *Small Bus. Econ.* 43, 21–38. <https://doi.org/10.1007/s11187-014-9577-1>
- Ang, J.S., 1992. On the Theory of Finance for Privately Held Firms. *J. Small Bus. Financ.* 1, 185–203.
- Archibugi, D., 2001. Pavitt'S Taxonomy Sixteen Years On: A Review Article. *Econ. Innov. New Technol.* 10, 415–425. <https://doi.org/10.1080/10438590100000016>

- Arenius, P., Engel, Y., Klyver, K., 2017. No particular action needed? A necessary condition analysis of gestation activities and firm emergence. *J. Bus. Ventur. Insights* 8, 87–92. <https://doi.org/10.1016/J.JBVI.2017.07.004>
- Åstebro, T., Chen, J., 2014. The entrepreneurial earnings puzzle: Mismeasurement or real? *J. Bus. Ventur.* 29, 88–105. <https://doi.org/10.1016/J.JBUSVENT.2013.04.003>
- Audretsch, D.B., Bönte, W., Mahagaonkar, P., 2012. Financial signaling by innovative nascent ventures: The relevance of patents and prototypes. *Res. Policy* 41, 1407–1421. <https://doi.org/10.1016/j.respol.2012.02.003>
- Audretsch, D.B., Klomp, L., Santarelli, E., Thurik, A.R., 2004. Gibrat's Law: Are the Services Different? *Rev. Ind. Organ.* 24, 301–324. <https://doi.org/10.1023/B:REIO.0000038273.50622.ec>
- Avery, R.B., Bostic, R.W., Samolyk, K.A., 1998. The role of personal wealth in small business finance. *J. Bank. Financ.* 22, 1019–1061. [https://doi.org/10.1016/S0378-4266\(98\)00016-8](https://doi.org/10.1016/S0378-4266(98)00016-8)
- Barney, J., 1991. Firm Resources and Sustained Competitive Advantage. *J. Manage.* 17, 99–120. <https://doi.org/10.1177/014920639101700108>
- Barney, J.B., Busenitz, L.W., Fiet, J.O., Moesel, D.D., 1996. New venture teams' assessment of learning assistance from venture capital firms. *J. Bus. Ventur.* 11, 257–272. [https://doi.org/10.1016/0883-9026\(95\)00011-9](https://doi.org/10.1016/0883-9026(95)00011-9)
- Bates, T., 1990. Entrepreneur Human Capital Inputs and Small Business Longevity. *Rev. Econ. Stat.* 72, 551. <https://doi.org/10.2307/2109594>
- Baughn, C.C., Sugheir, J., Neupert, K.E., 2010. Labor Flexibility and the Prevalence of High-Growth Entrepreneurial Activity. *J. Small Bus. Entrep.* 1, 1–15. <https://doi.org/10.1080/08276331.2010.10593470>
- Baumol, W.J., 1996. Entrepreneurship: Productive, unproductive, and destructive. *J. Bus. Ventur.* 11, 3–22. [https://doi.org/10.1016/0883-9026\(94\)00014-X](https://doi.org/10.1016/0883-9026(94)00014-X)
- Becker, G.S., 1962. Investment in Human Capital: A Theoretical Analysis. *J. Polit. Econ.* 70, 9–49. <https://doi.org/10.1086/258724>
- Bennett, R.J., Robson, P.J.A., Ober, R., Be Nn, T.J., Tt, E., Obson, L.J.A.R., 1999. The use of external business advice by SMEs in Britain. *Entrep. Reg. Dev.* 11, 155–180. <https://doi.org/10.1080/089856299283245>
- Berger, A.N., Udell, G.F., 2006. A more complete conceptual framework for SME finance. *J. Bank. Financ.* 30, 2945–2966. <https://doi.org/10.1016/j.jbankfn.2006.05.008>
- Berger, A.N., Udell, G.F., 1998. The economics of small business finance: The roles of private equity and debt markets in the financial growth cycle. *J. Bank. Financ.* 22, 613–673. [https://doi.org/10.1016/S0378-4266\(98\)00038-7](https://doi.org/10.1016/S0378-4266(98)00038-7)
- Bertoni, F., Colombo, M.G., Quas, A., 2015. The patterns of venture capital investment in Europe. *Small Bus. Econ.* 45, 543–560. <https://doi.org/10.1007/s11187-015-9662-0>
- Bertoni, F., D'Adda, D., Grilli, L., 2016. Cherry-picking or frog-kissing? A theoretical analysis of how investors select entrepreneurial ventures in thin venture capital markets. *Small Bus. Econ.* 46, 391–405. <https://doi.org/10.1007/s11187-015-9690-9>
- Bhide, A., 1992. Bootstrap finance: the art of start-ups. *Harv. Bus. Rev.* 70, 109–17.
- Biemann, T., Datta, D.K., 2014. Analyzing Sequence Data: Optimal Matching in Management Research. *Organ. Res. Methods* 17, 51–76. <https://doi.org/10.1177/1094428113499408>
- Biemann, T., Zacher, H., Feldman, D.C., 2012. Career patterns: A twenty-year panel study. *J. Vocat. Behav.* 81, 159–170. <https://doi.org/10.1016/j.jvb.2012.06.003>
- Blair-Loy, M., 1999. Career Patterns of Executive Women in Finance: An Optimal Matching Analysis. *Am. J. Sociol.* 104, 1346–1397. <https://doi.org/10.1086/210177>

- Block, J.H., Colombo, M.G., Cumming, D.J., Vismara, S., 2018a. New players in entrepreneurial finance and why they are there. *Small Bus. Econ.* 50, 239–250. <https://doi.org/10.1007/s11187-016-9826-6>
- Block, J.H., Kohn, K., Miller, D., Ullrich, K., 2015. Necessity entrepreneurship and competitive strategy. *Small Bus. Econ.* 44, 37–54. <https://doi.org/10.1007/s11187-014-9589-x>
- Block, J.H., Landgraf, A., 2016. Transition from part-time entrepreneurship to full-time entrepreneurship: the role of financial and non-financial motives. *Int. Entrep. Manag. J.* 12, 259–282. <https://doi.org/10.1007/s11365-014-0331-6>
- Block, J.H., Landgraf, A., Semrau, T., 2018b. The differential impact of societal cultural practices on part-time and full-time self-employment: A multi-level, multi-country study. *Int. Small Bus. J. Res. Entrep.* 1–26. <https://doi.org/10.1177/0266242618801441>
- Block, J.H., Wagner, M., 2010. Necessity and Opportunity Entrepreneurs in Germany: Characteristics and Earnings Differentials. *Schmalenbach Bus. Rev.* 62, 154–174. <https://doi.org/10.1007/BF03396803>
- Bögenhold, D., Klinglmair, A., 2016. One-person enterprises and the phenomenon of hybrid self-employment: evidence from an empirical study. *Empirica* 1–22. <https://doi.org/10.1007/s10663-016-9332-8>
- Bornhäll, A., Daunfeldt, S.-O., Rudholm, N., 2016. Employment protection legislation and firm growth: evidence from a natural experiment. *Ind. Corp. Chang.* 25, 1–17. <https://doi.org/10.1093/icc/dtw017>
- Bosma, N., Jones, K., Autio, E., Levie, J., 2008. Global Entrepreneurship Monitor - 2007 Executive Report.
- Bosma, N., Levie, J., 2009. Global entrepreneurship monitor 2009 Executive Report.
- Bosma, N., Van Praag, M., Thurik, R., De Wit, G., 2004. The Value of Human and Social Capital Investments for the Business Performance of Startups. *Small Bus. Econ.* 23, 227–236. <https://doi.org/10.1023/B:SBEJ.0000032032.21192.72>
- Brouwer, E., Kleinknecht, A., 1996. Firm size, small business presence and sales of innovative products: A micro-econometric analysis. *Small Bus. Econ.* 8, 189–201. <https://doi.org/10.1007/BF00388647>
- Brush, C.G., Edelman, L.F., Manolova, T.S., 2008a. The effects of initial location, aspirations, and resources on likelihood of first sale in nascent firms. *J. Small Bus. Manag.* 46, 159–182. <https://doi.org/10.1111/j.1540-627X.2008.00238.x>
- Brush, C.G., Greene, P.G., Hart, M.M., Haller, H.S., 2002. From Initial Idea to Unique Advantage: The Entrepreneurial Challenge of Constructing a Resource Base. *Acad. Manag. Exec.* 15, 64–78. <https://doi.org/10.1109/EMR.2002.1022409>
- Brush, C.G., Manolova, T.S., Edelman, L.F., 2008b. Properties of emerging organizations: An empirical test. *J. Bus. Ventur.* 23, 547–566. <https://doi.org/10.1016/j.jbusvent.2007.09.002>
- Buddensiek, M., Piorkowsky, M.-B., Herter-Eschweiler, R., 2013. *Selbstständige in Deutschland 1992 - 2011*. Bonn.
- Burgers, J.H., Van Den Bosch, F.A.J., Volberda, H.W., 2008. Why New Business Development Projects Fail: Coping with the Differences of Technological versus Market Knowledge. *Long Range Plann.* 41, 55–73. <https://doi.org/10.1016/J.LRP.2007.10.003>
- Burke, A.E., FitzRoy, F.R., Nolan, M.A., 2008. What makes a die-hard entrepreneur? Beyond the 'employee or entrepreneur' dichotomy. *Small Bus. Econ.* 31, 93–115. <https://doi.org/10.1007/s11187-007-9086-6>
- Burns, B.L., Barney, J.B., Angus, R.W., Herrick, H.N., 2016. Enrolling Stakeholders under Conditions of Risk and Uncertainty. *Strateg. Entrep. J.* 10, 97–106. <https://doi.org/10.1002/sej.1209>
- Busenitz, L.W., Fiet, J.O., Moesel, D.D., 2005. Signaling in Venture Capitalist-New Venture Team Funding Decisions: Does It Indicate Long-Term Venture Outcomes? *Entrep. Theory Pract.* 29, 1–12. <https://doi.org/10.1111/j.1540-6520.2005.00066.x>
- Busenitz, L.W., Gómez, C., Spencer, J.W., 2000. Country Institutional Profiles: Unlocking Entrepreneurial Phenomena. *Acad. Manag. J.* 43, 994–1003. <https://doi.org/10.2307/1556423>

- Cable, D.M., Shane, S., 1997. A prisoner's dilemma approach to entrepreneur-venture capitalist relationships. *Acad. Manag. Rev.* 22, 142–176. <https://doi.org/10.5465/AMR.1997.9707180262>
- Carayannopoulos, S., Auster, E.R., 2010. External knowledge sourcing in biotechnology through acquisition versus alliance: A KBV approach. *Res. Policy* 39, 254–267. <https://doi.org/10.1016/J.RESPOL.2009.12.005>
- Cardon, M.S., Stevens, C.E., 2004. Managing human resources in small organizations: What do we know? *Hum. Resour. Manag. Rev.* 14, 295–323. <https://doi.org/10.1016/j.hrmr.2004.06.001>
- Carrasco, R., 1999. Transitions to and From Self-employment in Spain: An Empirical Analysis. *Oxf. Bull. Econ. Stat.* 61, 315–341. <https://doi.org/10.1111/1468-0084.00132>
- Carter, N.M., Gartner, W.B., Reynolds, P.D., 1996. Exploring start-up event sequences. *J. Bus. Ventur.* 11, 151–166. [https://doi.org/10.1016/0883-9026\(95\)00129-8](https://doi.org/10.1016/0883-9026(95)00129-8)
- Carter, R.B., Van Auken, H.E., 1990. A comparison of small business and large corporations: Interrelationships among position statement accounts. *J. Bus. Entrep.* 2, 73–80.
- Cassar, G., 2004. The financing of business start-ups. *J. Bus. Ventur.* 19, 261–283. [https://doi.org/10.1016/S0883-9026\(03\)00029-6](https://doi.org/10.1016/S0883-9026(03)00029-6)
- Cassar, G., Ittner, C.D., 2009. Initial Retention of External Accountants in Startup Ventures. *Eur. Account. Rev.* 18, 313–340. <https://doi.org/10.1080/09638180902731562>
- Chandler, G.N., Honig, B., Wiklund, J., 2005. Antecedents, moderators, and performance consequences of membership change in new venture teams. *J. Bus. Ventur.* 20, 705–725. <https://doi.org/10.1016/j.jbusvent.2004.09.001>
- Chandler, G.N., Mckelvie, A., Davidsson, P., 2009. Asset specificity and behavioral uncertainty as moderators of the sales growth – Employment growth relationship in emerging ventures. *J. Bus. Ventur.* 24, 373–387. <https://doi.org/10.1016/j.jbusvent.2008.04.002>
- Chapman, G., Lucena, A., Afcha, S., 2018. R&D subsidies & external collaborative breadth: Differential gains and the role of collaboration experience. *Res. Policy* 47, 623–636. <https://doi.org/10.1016/J.RESPOL.2018.01.009>
- Chun, H., Mun, S.-B., 2012. Determinants of R&D cooperation in small and medium-sized enterprises. *Small Bus. Econ.* 39, 419–436. <https://doi.org/10.1007/s11187-010-9312-5>
- Coad, A., Guenther, C., 2014. Processes of firm growth and diversification: theory and evidence. *Small Bus. Econ.* 43, 857–871. <https://doi.org/10.1007/s11187-014-9566-4>
- Coad, A., Nielsen, K., Timmermans, B., 2016. My first employee: an empirical investigation. *Small Bus. Econ.* <https://doi.org/10.1007/s11187-016-9748-3>
- Cohen, S.L., Bingham, C.B., Hallen, B.L., 2018. The Role of Accelerator Designs in Mitigating Bounded Rationality in New Ventures. *Adm. Sci. Q.* 000183921878213. <https://doi.org/10.1177/0001839218782131>
- Colombo, M.G., Grilli, L., 2005. Founders' human capital and the growth of new technology-based firms: A competence-based view. *Res. Policy* 34, 795–816. <https://doi.org/10.1016/j.respol.2005.03.010>
- Cooper, A.C., Gimeno-Gascon, F.J., Woo, C.Y., Cooper, A., 1994. Initial human and financial capital as predictors of new venture performance. *J. Bus. Ventur.* 9, 371–395. [https://doi.org/10.1016/0883-9026\(94\)90013-2](https://doi.org/10.1016/0883-9026(94)90013-2)
- Cooper, A.C., Woo, C.Y., Dunkelberg, W.C., 1989. Entrepreneurship and the initial size of firms. *J. Bus. Ventur.* 4, 317–332. [https://doi.org/10.1016/0883-9026\(89\)90004-9](https://doi.org/10.1016/0883-9026(89)90004-9)
- Cornelissen, J.P., Clarke, J.S., 2010. Imagining and Rationalizing Opportunities: Inductive Reasoning and the Creation and Justification of New Ventures. *Acad. Manag. Rev.* 35, 539–557. <https://doi.org/10.5465/AMR.2010.53502700>
- Cosh, A., Cumming, D., Hughes, A., 2009. Outside entrepreneurial capital. *Econ. J.* 119, 1494–1533. <https://doi.org/10.1111/j.1468-0297.2009.02270.x>

- Cressy, R., 2002. Introduction: Funding Gaps: A Symposium. *Econ. J.* 112, 1–16.
- Cumming, D., Groh, A.P., 2018. Entrepreneurial finance: Unifying themes and future directions. *J. Corp. Financ.* 50, 538–555. <https://doi.org/10.1016/j.jcorpfin.2018.01.011>
- Cumming, D., Johan, S., 2017. The Problems with and Promise of Entrepreneurial Finance. *Strateg. Entrep. J.* 11, 357–370. <https://doi.org/10.1002/sej.1265>
- Cumming, D.J., 2005a. Capital structure in venture finance. *J. Corp. Financ.* 11, 550–585. <https://doi.org/10.1016/J.JCORPFIN.2004.02.004>
- Cumming, D.J., 2005b. Agency costs, institutions, learning, and taxation in venture capital contracting. *J. Bus. Ventur.* 20, 573–622. <https://doi.org/10.1016/J.JBUSVENT.2003.07.001>
- Cumming, D.J., Pandes, J.A., Robinson, M.J., 2015. The Role of Agents in Private Entrepreneurial Finance. *Entrep. Theory Pract.* 39, 345–374. <https://doi.org/10.1111/etap.12043>
- Dahl, M.S., Klepper, S., M., C.N., D., C., 2015. Whom do new firms hire? *Ind. Corp. Chang.* 24, 819–836. <https://doi.org/10.1093/icc/dtv026>
- Dahlander, L., O'Mahony, S., Gann, D.M., 2016. One foot in, one foot out: how does individuals' external search breadth affect innovation outcomes? *Strateg. Manag. J.* 37, 280–302. <https://doi.org/10.1002/smj.2342>
- Davidsson, P., Gordon, S.R., 2012. Panel studies of new venture creation: a methods-focused review and suggestions for future research. *Small Bus. Econ.* 39, 853–876. <https://doi.org/10.1007/s11187-011-9325-8>
- Davidsson, P., Gordon, S.R., 2009. Nascent entrepreneur(ship) research : a review (Working Paper).
- Davidsson, P., Henrekson, M., 2002. Determinants of the Prevalance of Start-ups and High-Growth Firms. *Small Bus. Econ.* 19, 81–104. <https://doi.org/10.1023/A:1016264116508>
- Davidsson, P., Honig, B., 2003. The role of social and human capital among nascent entrepreneurs. *J. Bus. Ventur.* 18, 301–331. [https://doi.org/10.1016/S0883-9026\(02\)00097-6](https://doi.org/10.1016/S0883-9026(02)00097-6)
- Davila, A., Foster, G., Gupta, M., 2003. Venture capital financing and the growth of startup firms. *J. Bus. Ventur.* 18, 689–708. [https://doi.org/10.1016/S0883-9026\(02\)00127-1](https://doi.org/10.1016/S0883-9026(02)00127-1)
- de Bettignies, J.-E., Brander, J.A., 2007. Financing entrepreneurship: Bank finance versus venture capital. *J. Bus. Ventur.* 22, 808–832. <https://doi.org/10.1016/J.JBUSVENT.2006.07.005>
- De Stefano, V., 2015. The rise of the just-in-time workforce: On-demand work, crowdwork, and labor protection in the gig-economy. *Comp. Lab. L. Pol'y J.* 37, 471.
- Delgado, M., Porter, M.E., Stern, S., 2010. Clusters and entrepreneurship. *J. Econ. Geogr.* 10, 495–518. <https://doi.org/10.1093/jeg/lbq010>
- Delmar, F., Shane, S., 2004. Legitimizing first: organizing activities and the survival of new ventures. *J. Bus. Ventur.* 19, 385–410. [https://doi.org/10.1016/S0883-9026\(03\)00037-5](https://doi.org/10.1016/S0883-9026(03)00037-5)
- Delmar, F., Shane, S., 2003. Does business planning facilitate the development of new ventures? *Strateg. Manag. J.* 24, 1165–1185. <https://doi.org/10.1002/smj.349>
- Demirgüç-Kunt, A., Maksimovic, V., 2002. Funding growth in bank-based and market-based financial systems: evidence from firm-level data. *J. financ. econ.* 65, 337–363. [https://doi.org/10.1016/S0304-405X\(02\)00145-9](https://doi.org/10.1016/S0304-405X(02)00145-9)
- Dilli, S., Elert, N., Herrmann, A.M., 2018. Varieties of entrepreneurship: exploring the institutional foundations of different entrepreneurship types through 'Varieties-of-Capitalism' arguments. *Small Bus. Econ.* 51, 293–320. <https://doi.org/10.1007/s11187-018-0002-z>
- Dimov, D., 2018. Entrepreneurial process, in: Gartner, W.B., Teague, B. (Eds.), *Research Handbook of Entrepreneurial Behavior, Practice, and Process*. Edward Elgar Publishing.

- Dimov, D., 2010. Nascent Entrepreneurs and Venture Emergence: Opportunity Confidence, Human Capital, and Early Planning. *J. Manag. Stud.* 47, 1123–1153. <https://doi.org/10.1111/j.1467-6486.2009.00874.x>
- Dixit, A.K., Pindyck, R., 1994. *Investment Under Uncertainty*. Princeton University Press, Princeton.
- Dlouhy, K., Biemann, T., 2015. Optimal matching analysis in career research: A review and some best-practice recommendations. *J. Vocat. Behav.* 90, 163–173. <https://doi.org/10.1016/j.jvb.2015.04.005>
- Drover, W., Busenitz, L., Matusik, S., Townsend, D., Anglin, A., Dushnitsky, G., 2017. A Review and Road Map of Entrepreneurial Equity Financing Research: Venture Capital, Corporate Venture Capital, Angel Investment, Crowdfunding, and Accelerators. *J. Manage.* 43, 1820–1853. <https://doi.org/10.1177/0149206317690584>
- Dutta, S., Folta, T.B., 2016. A comparison of the effect of angels and venture capitalists on innovation and value creation. *J. Bus. Ventur.* 31, 39–54. <https://doi.org/10.1016/j.jbusvent.2015.08.003>
- Easingwood, C.J., 1986. New product development for service companies. *J. Prod. Innov. Manag.* 3, 264–275. [https://doi.org/10.1016/0737-6782\(86\)90005-6](https://doi.org/10.1016/0737-6782(86)90005-6)
- Ebben, J., Johnson, A., 2006. Bootstrapping in small firms: An empirical analysis of change over time. *J. Bus. Ventur.* 21, 851–865. <https://doi.org/10.1016/j.jbusvent.2005.06.007>
- Ebben, J.J., 2009. Bootstrapping and the financial condition of small firms. *Int. J. Entrep. Behav. Res.* 15, 346–363. <https://doi.org/10.1108/13552550910967930>
- Eisenhardt, K.M., 1989. Agency Theory: An Assessment and Review. *Acad. Manag. Rev.* 14, 57–74. <https://doi.org/10.5465/AMR.1989.4279003>
- Eisenhardt, K.M., Martin, J.A., 2000. Dynamic capabilities: what are they? *Strateg. Manag. J.* 21, 1105–1121. [https://doi.org/10.1002/1097-0266\(200010/11\)21:10/11<1105::AID-SMJ133>3.0.CO;2-E](https://doi.org/10.1002/1097-0266(200010/11)21:10/11<1105::AID-SMJ133>3.0.CO;2-E)
- Eisenhardt, K.M., Schoonhoven, C.B., 2006. Organizational Growth: Linking Founding Team, Strategy, Environment, and Growth Among U.S. Semiconductor Ventures, 1978–1988. *Adm. Sci. Q.* 35, 504. <https://doi.org/10.2307/2393315>
- Eisenhardt, K.M., Schoonhoven, C.B., 1996. Resource-based View of Strategic Alliance Formation: Strategic and Social Effects in Entrepreneurial Firms. *Organ. Sci.* 7, 136–150. <https://doi.org/10.1287/orsc.7.2.136>
- Elert, N., Henrekson, M., Stenkula, M., 2017. *Institutional Reform for Innovation and Entrepreneurship An Agenda for Europe*. Springer International Publishing. <https://doi.org/10.1007/978-3-319-55092-3>
- Estévez-Abe, M., Iversen, T., 2001. Social protection and the formation of skills: A reinterpretation of the welfare state, in: Hall, P.A., Soskice, D. (Eds.), *Varieties of Capitalism - The Institutional Foundations of Comparative Advantage*. Oxford University Press, Oxford, pp. 145–183. <https://doi.org/10.1093/0199247757.003.0004>
- Eveleens, C.P., van Rijnsoever, F.J., Niesten, E.M.M.I., 2017. How network-based incubation helps start-up performance: a systematic review against the background of management theories. *J. Technol. Transf.* 42, 676–713. <https://doi.org/10.1007/s10961-016-9510-7>
- Fitjar, R.D., Rodríguez-Pose, A., 2013. Firm collaboration and modes of innovation in Norway. *Res. Policy* 42, 128–138. <https://doi.org/10.1016/J.RESPOL.2012.05.009>
- Folta, T.B., Delmar, F., Wennberg, K., 2010. Hybrid Entrepreneurship. *Manage. Sci.* 56, 253–269. <https://doi.org/10.1287/mnsc.1090.1094>
- Fox, J., Monette, G., 1992. Generalized Collinearity Diagnostics, *Journal of the American Statistical Association*.
- Frank, M.Z., Goyal, V.K., 2003. Testing the pecking order theory of capital structure. *J. financ. econ.* 67, 217–248. [https://doi.org/10.1016/S0304-405X\(02\)00252-0](https://doi.org/10.1016/S0304-405X(02)00252-0)

- Freel, M.S., Robson, P.J.A., 2004. Small Firm Innovation, Growth and Performance: Evidence from Scotland and Northern England. *Int. Small Bus. J.* 22, 561–575. <https://doi.org/10.1177/0266242604047410>
- Freitas, I.M.B., Clausen, T.H., Fontana, R., Verspagen, B., 2011. Formal and informal external linkages and firms' innovative strategies. A cross-country comparison. *J. Evol. Econ.* 21, 91–119. <https://doi.org/10.1007/s00191-010-0188-y>
- Frid, C.J., 2009. Acquiring Financial Resources to Form New Ventures: Pecking Order Theory and the Emerging Firm. *Front. Entrep. Res.* 29, 1.
- Frid, C.J., Gordon, S.R., Davidsson, P., Hechavarría, D.M., Reynolds, P.D., 2018. Publications Based on the Panel Study of Entrepreneurial Dynamics [WWW Document]. URL <http://www.psed.isr.umich.edu/psed/documentation>
- Fritsch, M., Weyh, A., 2006. How Large are the Direct Employment Effects of New Businesses? An Empirical Investigation for West Germany. *Small Bus. Econ.* 27, 245–260. <https://doi.org/10.1007/s11187-006-0005-z>
- Garnsey, E., Stam, E., Heffernan, P., 2006. New Firm Growth: Exploring Processes and Paths. *Ind. Innov.* 13, 1–20. <https://doi.org/10.1080/13662710500513367>
- Gartner, W.B., 1988. "Who Is an Entrepreneur" Is the Wrong Question. *Am. J. Small Bus.* 12, 11–32.
- Gartner, W.B., 1985. A Conceptual Framework for Describing the Phenomenon of New Venture Creation. *Acad. Manag. Rev.* 10, 696–706. <https://doi.org/10.5465/AMR.1985.4279094>
- Gartner, W.B., Carter, N.M., Reynolds, P.D., 2004. Business Start-up Activities, in: *Handbook of Entrepreneurial Dynamics - The Process of Business Creation*. Sage Publications Ltd., pp. 285–298. <https://doi.org/http://dx.doi.org/10.4135/9781452204543.n26>
- Gartner, W.B., Frid, C.J., Alexander, J.C., 2012. Financing the emerging firm. *Small Bus. Econ.* 39, 745–761. <https://doi.org/10.1007/s11187-011-9359-y>
- Gartner, W.B., Shaver, K.G., 2012. Nascent entrepreneurship panel studies: Progress and challenges. *Small Bus. Econ.* 39, 659–665. <https://doi.org/10.1007/s11187-011-9353-4>
- Gatewood, E.J., Shaver, K.G., Gartner, W.B., 1995. A longitudinal study of cognitive factors influencing start-up behaviors and success at venture creation. *J. Bus. Ventur.* 10, 371–391. [https://doi.org/10.1016/0883-9026\(95\)00035-7](https://doi.org/10.1016/0883-9026(95)00035-7)
- Geletkanycz, M.A., Hambrick, D.C., Abrahamson, E., Burt, R., Leifer, E., Mishra, A., 1997. The External Ties of Top Executives: Implications for Strategic Choice and Performance. *Adm. Sci. Q.* 42, 654–681.
- Glaeser, E.L., Kerr, W.R., 2009. Local Industrial Conditions and Entrepreneurship: How Much of the Spatial Distribution Can We Explain? *J. Econ. Manag. Strateg.* 18, 623–663. <https://doi.org/10.1111/j.1530-9134.2009.00225.x>
- Glaister, K.W., 1998. Strategic Motives for UK International Alliance Formation, in: *International Strategic Management and Government Policy*. Palgrave Macmillan UK, London, pp. 40–77. https://doi.org/10.1007/978-1-349-26646-3_4
- Global Entrepreneurship Research Association, 2018. *Global Entrepreneurship Monitor: Global Report 2017/18*.
- Gompers, P.A., Lerner, J., 1998. What Drives Venture Capital Fundraising? (No. w6906), National bureau of economic research.
- Gordon, S.R., 2012. Dimensions of the venture creation process : Amount , dynamics , and sequences of action in nascent entrepreneurship.
- Gordon, S.R., Davidsson, P., 2013. Unpacking the venture creation process (No. 7), *Business Creation in Australia*. Brisbane.
- Gorman, M., Sahlman, W.A., 1989. What do venture capitalists do? *J. Bus. Ventur.* 4, 231–248. [https://doi.org/10.1016/0883-9026\(89\)90014-1](https://doi.org/10.1016/0883-9026(89)90014-1)

- Grant, R.M., 1997. The knowledge-based view of the firm: Implications for management practice. *Long Range Plann.* 30, 450–454. [https://doi.org/10.1016/S0024-6301\(97\)00025-3](https://doi.org/10.1016/S0024-6301(97)00025-3)
- Grichnik, D., Brinckmann, J., Singh, L., Manigart, S., 2014. Beyond environmental scarcity: Human and social capital as driving forces of bootstrapping activities. *J. Bus. Ventur.* 29, 310–326. <https://doi.org/10.1016/j.jbusvent.2013.02.006>
- Haeussler, C., Patzelt, H., Zahra, S.A., 2012. Strategic alliances and product development in high technology new firms: The moderating effect of technological capabilities. *J. Bus. Ventur.* 27, 217–233. <https://doi.org/10.1016/J.JBUSVENT.2010.10.002>
- Hall, P.A., Soskice, D., 2001. An Introduction to Varieties of Capitalism, in: Hall, P.A., Soskice, D. (Eds.), *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*. Oxford University Press, Oxford, pp. 1–71. <https://doi.org/10.1093/0199247757.003.0001>
- Halpin, B., 2010. Optimal Matching Analysis and Life-Course Data: The Importance of Duration. *Sociol. Methods Res.* 38, 365–388. <https://doi.org/10.1177/0049124110363590>
- Harrison, R.T., Mason, C.M., Girling, P., 2004. Financial bootstrapping and venture development in the software industry. *Entrep. Reg. Dev.* 16, 307–333. <https://doi.org/10.1080/0898562042000263276>
- Hechavarría, D.M., Matthews, C.H., Reynolds, P.D., 2016. Does start-up financing influence start-up speed? Evidence from the panel study of entrepreneurial dynamics. *Small Bus. Econ.* 46, 137–167. <https://doi.org/10.1007/s11187-015-9680-y>
- Held, L., Herrmann, A.M., van Mossel, A., 2018. Team formation processes in new ventures. *Small Bus. Econ.* 51, 1–24. <https://doi.org/10.1007/s11187-018-0010-z>
- Hellerstedt, K., 2009. *The Composition of New Venture Teams Its Dynamics and Consequences*. Jönköping International Business School.
- Hennart, J.-F., 1991. The Transaction Costs Theory of Joint Ventures: An Empirical Study of Japanese Subsidiaries in the United States. *Manage. Sci.* 37, 483–497.
- Henrekson, M., Johansson, D., Stenkula, M., 2010. Taxation, Labor Market Policy and High-Impact Entrepreneurship. *J. Ind. Compet. Trade* 10, 275–296. <https://doi.org/10.1007/s10842-010-0081-2>
- Herrmann, A.M., 2019. A plea for varieties of entrepreneurship. *Small Bus. Econ.* 52, 331–343. <https://doi.org/10.1007/s11187-018-0093-6>
- Herrmann, A.M., 2008. *One Political Economy, One Competitive Strategy?: Comparing Pharmaceutical Firms in Germany, Italy, and the UK*. Oxford University Press.
- Herrmann, A.M., Peine, A., 2011. When 'national innovation system' meet 'varieties of capitalism' arguments on labour qualifications: On the skill types and scientific knowledge needed for radical and incremental product innovations. *Res. Policy* 40, 687–701. <https://doi.org/10.1016/j.respol.2011.02.004>
- Hessels, J., van Stel, A., Brouwers, P., Wennekers, S., 2006. Social Security Arrangements and Early-Stage Entrepreneurial Activity. *Comp. Labor Law Policy J.* 28, 743–774.
- Hillmann, K., 2016. *Transitions between Employment, Unemployment and Entrepreneurial Activities – Evidence from Germany*. Universität Hamburg.
- Hirsch-Kreinsen, H., 2011. Financial market and technological innovation. *Ind. Innov.* 18, 351–368. <https://doi.org/10.1080/13662716.2011.573954>
- Hjorth, D., Holt, R., Steyaert, C., 2015. Entrepreneurship and process studies. *Int. Small Bus. J.* 33, 599–611. <https://doi.org/10.1177/0266242615583566>
- Ho, Y.P., Wong, P.K., 2007. Financing, regulatory costs and entrepreneurial propensity. *Small Bus. Econ.* 28, 187–204. <https://doi.org/10.1007/s11187-006-9015-0>
- Hoang, H., Antoncic, B., 2003. Network-based research in entrepreneurship: A critical review. *J. Bus. Ventur.* 18, 165–187. [https://doi.org/10.1016/S0883-9026\(02\)00081-2](https://doi.org/10.1016/S0883-9026(02)00081-2)

- Hoang, H., Rothaermel, F.T., 2010. Leveraging internal and external experience: exploration, exploitation, and R&D project performance. *Strateg. Manag. J.* 31, 734–758. <https://doi.org/10.1002/smj.834>
- Howell, S.T., 2017. Financing Innovation: Evidence from R&D Grants. *Am. Econ. Rev.* 107, 1136–1164. <https://doi.org/10.1257/aer.20150808>
- Hsu, D.H., 2006. Venture Capitalists and Cooperative Start-up Commercialization Strategy. *Manage. Sci.* 52, 204–219. <https://doi.org/10.1287/mnsc.1050.0480>
- Hyytinen, A., Pajarinen, M., Rouvinen, P., 2015. Does innovativeness reduce startup survival rates? *J. Bus. Ventur.* 30, 564–581. <https://doi.org/10.1016/j.jbusvent.2014.10.001>
- Ireland, R.D., Hitt, M.A., Vaidyanath, D., 2002. Alliance Management as a Source of Competitive Advantage. *J. Manage.* 28, 413–446. [https://doi.org/10.1016/S0149-2063\(02\)00134-4](https://doi.org/10.1016/S0149-2063(02)00134-4)
- Islam, M., Fremeth, A., Marcus, A., 2018. Signaling by early stage startups: US government research grants and venture capital funding. *J. Bus. Ventur.* 33, 35–51. <https://doi.org/10.1016/J.JBUSVENT.2017.10.001>
- Jaspers, F., Hak, T., 2013. The Sequence of Gestation Activities and its Impact on Achieving Sustained Sales, in: DRUID Celebration Conference 2013.
- Jassawalla, A.R., Sashittal, H.C., 1998. An Examination of Collaboration in High-Technology New Product Development Processes. *J. Prod. Innov. Manag.* 15, 237–254. [https://doi.org/10.1016/S0737-6782\(97\)00080-5](https://doi.org/10.1016/S0737-6782(97)00080-5)
- Jensen, M.C., Meckling, W.H., 1976. Theory of the firm: Managerial behavior, agency costs and ownership structure. *J. financ. econ.* 3, 305–360. [https://doi.org/10.1016/0304-405X\(76\)90026-X](https://doi.org/10.1016/0304-405X(76)90026-X)
- Jonsson, S., Lindbergh, J., 2013. The Development of Social Capital and Financing of Entrepreneurial Firms: From Financial Bootstrapping to Bank Funding. *Entrep. Theory Pract.* 37, 661–686. <https://doi.org/10.1111/j.1540-6520.2011.00485.x>
- Kane, G.C., 2016. Crowd-Based Capitalism? Empowering Entrepreneurs in the Sharing Economy. *MIT Sloan Manag. Rev.* 57.
- Katz, J., Gartner, W.B., 1988. Properties of Emerging Organizations. *Acad. Manag. Rev.* 13, 429–441. <https://doi.org/10.5465/AMR.1988.4306967>
- Kaulio, M.A., 2003. Initial conditions or process of development? Critical incidents in the early stages of new ventures. *R&D Manag.* 33, 165. <https://doi.org/10.1111/1467-9310.00290>
- Kazanjian, R.K., Drazin, R., 1990. A Stage-Contingent Model of Design and Growth for Technology Based New Ventures. *J. Bus. Ventur.* 5, 137–150. [https://doi.org/10.1016/0883-9026\(90\)90028-R](https://doi.org/10.1016/0883-9026(90)90028-R)
- Klotz, A.C., Hmieleski, K.M., Bradley, B.H., Busenitz, L.W., 2014. New Venture Teams: A Review of the Literature and Roadmap for Future Research The NVT Domain. *J. Manage.* 40, 226–255. <https://doi.org/10.1177/0149206313493325>
- Koch, A., Späth, J., Strotmann, H., 2013. The role of employees for post-entry firm growth. *Small Bus. Econ.* 41, 733–755. <https://doi.org/10.1007/s11187-012-9456-6>
- Koellinger, P., Minniti, M., 2009. Unemployment benefits crowd out nascent entrepreneurial activity. *Econ. Lett.* 103, 96–98. <https://doi.org/10.1016/J.ECONLET.2009.02.002>
- Lam, W., 2010. Funding gap, what funding gap? Financial bootstrapping: Supply, demand and creation of entrepreneurial finance. *Int. J. Entrep. Behav. Res.* 16, 268–295. <https://doi.org/10.1108/13552551011054480>
- Landgraf, A., 2015. Part-time entrepreneurship: Micro-level and macro-level determinants. Universität Trier.
- Langley, A., Montréal, H., Smallman, C., Vandeven, A.H., 2013. Process Studies of Change in Organization and Management: Unveiling Temporality, Activity and Flow. *Acad. Manag. J.* 56, 1–13. <https://doi.org/10.5465/amj.2013.4001>

- Lechevalier, S., Nishimura, J., Storz, C., 2014. Diversity in patterns of industry evolution: How an intrapreneurial regime contributed to the emergence of the service robot industry. *Res. Policy* 43, 1716–1729. <https://doi.org/10.1016/J.RESPOL.2014.07.012>
- Lee, N., Sameen, H., Cowling, M., 2015. Access to finance for innovative SMEs since the financial crisis. *Res. Policy* 44, 370–380. <https://doi.org/10.1016/J.RESPOL.2014.09.008>
- Lee, S., Park, G., Yoon, B., Park, J., 2010. Open innovation in SMEs—An intermediated network model. *Res. Policy* 39, 290–300. <https://doi.org/10.1016/J.RESPOL.2009.12.009>
- Leiponen, A., 2005. Skills and innovation. *Int. J. Ind. Organ.* 23, 303–323. <https://doi.org/10.1016/J.IJINDORG.2005.03.005>
- Leiponen, A., Helfat, C.E., 2011. Location, Decentralization, and Knowledge Sources for Innovation. *Organ. Sci.* 22, 641–658. <https://doi.org/10.1287/orsc.1100.0526>
- Lerner, J., Tag, J., 2013. Institutions and venture capital. *Ind. Corp. Chang.* 22, 153–182. <https://doi.org/10.1093/icc/dts050>
- Lesnard, L., 2010. Setting Cost in Optimal Matching to Uncover Contemporaneous Socio-Temporal Patterns. *Sociol. Methods Res.* 38, 389–419. <https://doi.org/10.1177/0049124110362526>
- Levie, J., Lichtenstein, B.B., 2010. A terminal assessment of stages theory: Introducing a dynamic states approach to entrepreneurship. *Entrep. Theory Pract.* 34, 317–350. <https://doi.org/10.1111/j.1540-6520.2010.00377.x>
- Li, Y., Zahra, S.A., 2012. Formal institutions, culture, and venture capital activity: A cross-country analysis. *J. Bus. Ventur.* 27, 95–111. <https://doi.org/10.1016/J.JBUSVENT.2010.06.003>
- Liao, J., Welsch, H., 2008. Patterns of venture gestation process: Exploring the differences between tech and non-tech nascent entrepreneurs. *J. High Technol. Manag. Res.* 19, 103–113. <https://doi.org/10.1016/j.hitech.2008.10.003>
- Liao, J., Welsch, H., Moutray, C., 2008. Start-Up REsources and Entrepreneurial Discontinuance: The Case of Nascent Entrepreneurs. *J. Small Bus. Strateg.* 19, 1–16.
- Liao, J., Welsch, H., Tan, W.L., 2005. Venture gestation paths of nascent entrepreneurs: Exploring the temporal patterns. *J. High Technol. Manag. Res.* 16, 1–22. <https://doi.org/10.1016/j.hitech.2005.06.001>
- Lichtenstein, B.B., Carter, N.M., Dooley, K.J., Gartner, W.B., 2007. Complexity dynamics of nascent entrepreneurship. *J. Bus. Ventur.* 22, 236–261. <https://doi.org/10.1016/j.jbusvent.2006.06.001>
- Malerba, F., 2007. Innovation and the dynamics and evolution of industries: Progress and challenges. *Int. J. Ind. Organ.* 25, 675–699. <https://doi.org/10.1016/J.IJINDORG.2006.07.005>
- March, J.G., 1991. Exploration and Exploitation in Organizational Learning. *Organ. Sci.* 2, 71–87. <https://doi.org/10.1287/orsc.2.1.71>
- Mascitelli, R., 2000. From experience: harnessing tacit knowledge to achieve breakthrough innovation. *J. Prod. Innov. Manag.* 17, 179–193. [https://doi.org/10.1016/S0737-6782\(00\)00038-2](https://doi.org/10.1016/S0737-6782(00)00038-2)
- McMullen, J.S., Dimov, D., 2013. Time and the entrepreneurial journey: The problems and promise of studying entrepreneurship as a process. *J. Manag. Stud.* 50, 1481–1512. <https://doi.org/10.1111/joms.12049>
- Melillo, F., Folta, T.B., Delmar, F., 2013. What Determines the Initial Size of New Ventures?, in: DRUID Celebration Conference 2013.
- Metzger, G., 2014. Gründungstätigkeit wiederbelebt – Impuls aus dem Nebenerwerb.
- Meyskens, M., Carsrud, A.L., 2013. Nascent green-technology ventures: a study assessing the role of partnership diversity in firm success. *Small Bus. Econ.* 40, 739–759. <https://doi.org/10.1007/s11187-011-9400-1>

- Michaelas, N., Chittenden, F., Poutziouris, P., 1999. Financial Policy and Capital Structure Choice in U.K. SMEs: Empirical Evidence from Company Panel Data. *Small Bus. Econ.* 12, 113–130. <https://doi.org/10.1023/A:1008010724051>
- Migendt, M., Polzin, F., Schock, F., Täube, F.A., von Flotow, P., 2017. Beyond venture capital: an exploratory study of the finance-innovation-policy nexus in cleantech. *Ind. Corp. Chang.* 26, 973–996. <https://doi.org/10.1093/icc/dtx014>
- Mina, A., Lahr, H., Hughes, A., 2013. The demand and supply of external finance for innovative firms. *Ind. Corp. Chang.* 22, 869–901. <https://doi.org/10.1093/icc/dtt020>
- Molina, Ó., Rhodes, M., 2007. The Political Economy of Adjustment in Mixed Market Economies: A Study of Spain and Italy, in: *Beyond Varieties of Capitalism*. Oxford University Press, Oxford. <https://doi.org/10.1093/acprof:oso/9780199206483.003.0008>
- Moroz, P.W., Hindle, K., 2012. Entrepreneurship as a Process: Toward Harmonizing Multiple Perspectives. *Entrep. Theory Pract.* 36, 781–818. <https://doi.org/10.1111/j.1540-6520.2011.00452.x>
- Myers, S.C., Majluf, N.S., 1984. Corporate financing and investment decisions when firms have information that investors do not have. *J. financ. econ.* 13, 187–221. [https://doi.org/10.1016/0304-405X\(84\)90023-0](https://doi.org/10.1016/0304-405X(84)90023-0)
- Newbert, S.L., 2005. New Firm Formation: A Dynamic Capability Perspective. *J. Small Bus. Manag.* 43, 55–77. <https://doi.org/10.1111/j.1540-627X.2004.00125.x>
- Nieto, M.J., Santamaría, L., 2007. The importance of diverse collaborative networks for the novelty of product innovation. *Technovation* 27, 367–377. <https://doi.org/10.1016/J.TECHNOVATION.2006.10.001>
- Nightingale, P., Murray, G., Cowling, M., Baden-Fuller, C., Mason, C., Siepel, J., Hopkins, M., Dannreuther, C., 2009. From funding gaps to thin markets UK Government support for early-stage venture capital.
- Nijssen, E.J., Hillebrand, B., Vermeulen, P.A.M., Kemp, R.G.M., 2006. Exploring product and service innovation similarities and differences. *Int. J. Res. Mark.* 23, 241–251. <https://doi.org/10.1016/J.IJRESMAR.2006.02.001>
- North, D.C., 1990. *Institutions, institutional change and economic performance*. Cambridge University Press.
- Norton, E., 1991. Capital structure and small public firms. *J. Bus. Ventur.* 6, 287–303. [https://doi.org/10.1016/0883-9026\(91\)90020-E](https://doi.org/10.1016/0883-9026(91)90020-E)
- O'Brien, J.P., Folta, T.B., Johnson, D.R., 2003. A Real Options Perspective on Entrepreneurial Entry in the Face of Uncertainty. *Manag. Decis. Econ.* 24, 515–533. <https://doi.org/10.1002/1115>
- Okamuro, H., Kato, M., Honjo, Y., 2011. Determinants of R&D cooperation in Japanese start-ups. *Res. Policy* 40, 728–738. <https://doi.org/10.1016/J.RESPOL.2011.01.012>
- Østergaard, C.R., Timmermans, B., Kristinsson, K., 2011. Does a different view create something new? The effect of employee diversity on innovation. *Res. Policy* 40, 500–509. <https://doi.org/10.1016/J.RESPOL.2010.11.004>
- Packalen, K.A., 2007. Complementing Capital: The Role of Status, Demographic Features, and Social Capital in Founding Teams' Abilities to Obtain Resources. *Entrep. Theory Pract.* 31, 873–891. <https://doi.org/10.1111/j.1540-6520.2007.00210.x>
- Paier, M., Scherngell, T., 2010. Determinants of Collaboration in European R&D Networks: Empirical Evidence from a Discrete Choice Model. *Ind. Innov.* 18, 89–104. <https://doi.org/10.1080/13662716.2010.528935>
- Parker, S.C., 2010. Contracting Out, Public Policy and Entrepreneurship. *Scott. J. Polit. Econ.* 57, 119–144. <https://doi.org/10.1111/j.1467-9485.2010.00510>

- Parker, S.C., 2009. *The Economics of Entrepreneurship*. Cambridge University Press.
- Penrose, E.T., 1959. *The Theory of the Growth of the Firm*. Sharpe, New York.
- Petrova, K., 2012. Part-time entrepreneurship and financial constraints: evidence from the Panel Study of Entrepreneurial Dynamics. *Small Bus. Econ.* 39, 473–493. <https://doi.org/10.1007/s11187-010-9310-7>
- Petrova, K., 2011. Part-Time Entrepreneurship, Learning and Ability. *J. Manag. Policy Pract.* 12, 64–75.
- Pfeffer, J., Salancik, G.R., 1978. *The external control of organizations: A resource dependence perspective*. Harper & Row, New York.
- Phelps, R., Adams, R.J., Bessant, J., 2007. Life cycles of growing organizations: A review with implications for knowledge and learning. *Int. J. Manag. Rev.* 9, 1–30. <https://doi.org/10.1111/j.1468-2370.2007.00200.x>
- Plummer, L.A., Allison, T.H., Connelly, B.L., 2016. Better Together? Signaling Interactions in New Venture Pursuit of Initial External Capital. *Acad. Manag. J.* 59, 1585–1604. <https://doi.org/10.5465/amj.2013.0100>
- Pollock, G., 2007. Holistic Trajectories: A Study of Combined Employment, Housing and Family Careers by Using Multiple-sequence Analysis. *J. R. Stat. Soc. Ser. A (Statistics Soc.* 170, 167–183. <https://doi.org/10.1111/j.1467-985X.2006.00450.x>
- Poole, M.S., van de Ven, A.H., Dooley, K., Holmes, M.E., 2000. *Organizational Change and Innovation Processes: Theory and Methods for Research*. Oxford University Press, New York, NY.
- Powell, W.W., Koput, K.W., Smith-Doerr, L., 1996. Interorganizational collaboration and the locus of innovation: Networks of learning in biotechnology. *Adm. Sci. Q.* 41, 1125, 116–145.
- Raffee, J., Feng, J., 2014. Should I quit my Day Job? A hybrid path to Entrepreneurship. *Acad. Manag. J.* 57, 936–963. <https://doi.org/10.5465/amj.2012.0522>
- Reymen, I.M.M.J., Andries, P., Berends, H., Mauer, R., Stephan, U., van Burg, E., 2015. Understanding Dynamics of Strategic Decision Making in Venture Creation: A Process Study of Effectuation and Causation. *Strateg. Entrep. J.* 9, 351–379. <https://doi.org/10.1002/sej.1201>
- Reynolds, P., Miller, B., 1992. New firm gestation: Conception, birth, and implications for research. *J. Bus. Ventur.* 7, 405–417. [https://doi.org/10.1016/0883-9026\(92\)90016-K](https://doi.org/10.1016/0883-9026(92)90016-K)
- Reynolds, P., White, S.B., 1997. *The Entrepreneurial Process*. Quorum Books, Westport.
- Roach, M., Sauermaun, H., 2015. Founder or Joiner? The Role of Preferences and Context in Shaping Different Entrepreneurial Interests. *Manage. Sci.* 61, 2160–2184. <https://doi.org/10.1287/mnsc.2014.2100>
- Robb, A.M., Robinson, D.T., 2014. The Capital Structure Decisions of New Firms. *Rev. Financ. Stud.* 27, 153–179. <https://doi.org/10.1093/rfs/hhs072>
- Rocha, H.O., Sternberg, R., 2005. Entrepreneurship: The Role of Clusters Theoretical Perspectives and Empirical Evidence from Germany. *Small Bus. Econ.* 24, 267–292. <https://doi.org/10.1007/s11187-005-1993-9>
- Román, C., Congregado, E., Millán, J.M., 2013. Start-up incentives: Entrepreneurship policy or active labour market programme? *J. Bus. Ventur.* 28, 151–175. <https://doi.org/10.1016/j.jbusvent.2012.01.004>
- Román, C., Congregado, E., Millán, J.M., 2011. Dependent self-employment as a way to evade employment protection legislation. *Small Bus. Econ.* 37, 363–392. <https://doi.org/10.1007/s11187-009-9241-3>
- Rothaermel, F.T., 2001. Incumbent's advantage through exploiting complementary assets via interfirm cooperation. *Strateg. Manag. J.* 22, 687–699. <https://doi.org/10.1002/smj.180>
- Rothaermel, F.T., Deeds, D.L., 2004. Exploration and exploitation alliances in biotechnology: a system of new product development. *Strateg. Manag. J.* 25, 201–221. <https://doi.org/10.1002/smj.376>

- Ruef, M., 2005. Origins of Organizations: The Entrepreneurial Process, in: Keister, L.A. (Ed.), *Entrepreneurship (Research in the Sociology of Work, Volume 15)*. Emerald Group Publishing Limited, pp. 63–100. [https://doi.org/10.1016/S0277-2833\(05\)15004-3](https://doi.org/10.1016/S0277-2833(05)15004-3)
- Samuelsson, M., Davidsson, P., 2009. Does venture opportunity variation matter? investigating systematic process differences between innovative and imitative new ventures. *Small Bus. Econ.* 33, 229–255. <https://doi.org/10.1007/s11187-007-9093-7>
- Sapienza, H.J., Korsgaard, M.A., Forbes, D.P., 2003. The self-determination motive and entrepreneurs' choice of financing, in: *Cognitive Approaches to Entrepreneurship Research*. pp. 105–138. [https://doi.org/10.1016/S1074-7540\(03\)06005-7](https://doi.org/10.1016/S1074-7540(03)06005-7)
- Schulz, M., Urbig, D., Procher, V., 2016. Hybrid entrepreneurship and public policy: The case of firm entry deregulation. *J. Bus. Ventur.* 31, 272–286. <https://doi.org/10.1016/j.jbusvent.2016.01.002>
- Shan, W., Walker, G., Kogut, B., 1994. Interfirm Cooperation and Startup Innovation in the Biotechnology Industry. *Strateg. Manag. J.* 15, 387–394.
- Shane, S., 2009. Why encouraging more people to become entrepreneurs is bad public policy. *Small Bus. Econ.* 33, 141–149. <https://doi.org/10.1007/s11187-009-9215-5>
- Shane, S., Cable, D., 2002. Network Ties, Reputation, and the Financing of New Ventures. *Manage. Sci.* 48, 364–381. <https://doi.org/10.1287/mnsc.48.3.364.7731>
- Shane, S., Venkataraman, S., 2000. The Promise of Entrepreneurship as a Field of Research. *Acad. Manag. Rev.* 25, 217–226. <https://doi.org/10.5465/AMR.2000.2791611>
- Sine, W.D., Mitsuhashi, H., Kirsch, D.A., 2006. Revisiting Burns And Stalker: Formal Structure And New Venture Performance In Emerging Economic Sectors. *Acad. Manag. J.* 49, 121–132. <https://doi.org/10.5465/AMJ.2006.20785590>
- Sogorb-Mira, F., 2005. How SME Uniqueness Affects Capital Structure: Evidence From A 1994–1998 Spanish Data Panel. *Small Bus. Econ.* 25, 447–457. <https://doi.org/10.1007/s11187-004-6486-8>
- Soh, P.-H., 2003. The role of networking alliances in information acquisition and its implications for new product performance. *J. Bus. Ventur.* 18, 727–744. [https://doi.org/10.1016/S0883-9026\(03\)00026-0](https://doi.org/10.1016/S0883-9026(03)00026-0)
- Sorensen, M., 2007. How Smart Is Smart Money? A Two-Sided Matching Model of Venture Capital. *J. Finance* 62, 2725–2762. <https://doi.org/10.1111/j.1540-6261.2007.01291.x>
- Spigel, B., Harrison, R., 2018. Toward a process theory of entrepreneurial ecosystems. *Strateg. Entrep. J.* 12, 151–168. <https://doi.org/10.1002/sej.1268>
- Stam, E., 2015. Entrepreneurial Ecosystems and Regional Policy: A Sympathetic Critique. *Eur. Plan. Stud.* 23, 1759–1769. <https://doi.org/10.1080/09654313.2015.1061484>
- Stiglitz, J.E., Weiss, A., 1981. Credit Rationing in Markets with Imperfect Information. *Am. Econ. Rev.* 71, 393–410.
- Stinchcombe, A.L., 1965. Social structure and organizations, in: March, J.G. (Ed.), *Handbook of Organizations*. Rand McNally, Chicago, pp. 142–193.
- Storey, D.J., 1994. The role of legal status in influencing bank financing and new firm growth. *Appl. Econ.* 26, 129–136. <https://doi.org/10.1080/00036849400000068>
- Stovel, K., Bearman, P., 1996. Ascription into Achievement: Models of Career Systems at Lloyds. *Am. J. Sociol.* 102, 1890–1970. <https://doi.org/10.1086/230950>
- Stovel, K., Bolan, M., 2004. Residential Trajectories. *Sociol. Methods Res.* 32, 559–598. <https://doi.org/10.1177/0049124103262683>
- Sullivan, S.E., 1999. The changing nature of careers: a review and research agenda. *J. Manage.* 25, 457–484. [https://doi.org/10.1016/S0149-2063\(99\)00009-4](https://doi.org/10.1016/S0149-2063(99)00009-4)
- Sullivan, S.E., Baruch, Y., 2009. Advances in Career Theory and Research: A Critical Review and Agenda for Future Exploration. *J. Manage.* 35, 1542–1571. <https://doi.org/10.1177/0149206309350082>

- Tate, J., 2001. National Varieties of Standardization, in: *Varieties of Capitalism*. Oxford University Press, pp. 442–473. <https://doi.org/10.1093/0199247757.003.0014>
- Teece, D.J., Pisano, G., Shuen, A., 1997. Dynamic capabilities and strategic management. *Strateg. Manag. J.* 18, 509–533. [https://doi.org/10.1002/\(SICI\)1097-0266\(199708\)18:7<509::AID-SMJ882>3.0.CO;2-Z](https://doi.org/10.1002/(SICI)1097-0266(199708)18:7<509::AID-SMJ882>3.0.CO;2-Z)
- Teubner, G., 2001. Legal Irritants: How Unifying Law Ends up in New Divergences, in: *Varieties of Capitalism*. Oxford University Press, pp. 417–441. <https://doi.org/10.1093/0199247757.003.0013>
- Thorgren, S., Sirén, C., Nordström, C., Wincent, J., 2016. Hybrid entrepreneurs' second-step choice: The nonlinear relationship between age and intention to enter full-time entrepreneurship. *J. Bus. Ventur. Insights* 5, 14–18. <https://doi.org/10.1016/j.jbvi.2015.12.001>
- Townsend, D.M., Busenitz, L.W., 2015. Turning water into wine? Exploring the role of dynamic capabilities in early-stage capitalization processes. *J. Bus. Ventur.* 30, 292–306. <https://doi.org/10.1016/j.jbusvent.2014.07.008>
- Ucbasaran, D., Lockett, A., Wright, M., Westhead, P., 2003. Entrepreneurial Founder Teams: Factors Associated with Member Entry and Exit. *Entrep. Theory Pract.* 28, 107–128. <https://doi.org/10.1046/j.1540-6520.2003.00034.x>
- Ucbasaran, D., Westhead, P., Wright, M., 2001. The Focus of Entrepreneurial Research: Contextual and Process Issues. *Entrep. Theory Pract.* 25, 57–81.
- Valcour, P.M., Tolbert, P., 2003. Gender, family and career in the era of boundarylessness: determinants and effects of intra- and inter-organizational mobility. *Int. J. Hum. Resour. Manag.* 14, 768–787. <https://doi.org/10.1080/0958519032000080794>
- Van Auken, H., 2005. Differences in the Usage of Bootstrap Financing among Technology-Based versus Nontechnology-Based Firms. *J. Small Bus. Manag.* 43, 93–103. <https://doi.org/10.1111/j.1540-627X.2004.00127.x>
- Van de Ven, A.H., Engleman, R.M., 2004. Event- and outcome-driven explanations of entrepreneurship. *J. Bus. Ventur.* 19, 343–358. [https://doi.org/10.1016/S0883-9026\(03\)00035-1](https://doi.org/10.1016/S0883-9026(03)00035-1)
- Van de Ven, A.H., Venkataraman, S., Polley, D., Garud, R., 1989. Processes of new business creation in different organizational settings, in: Van de Ven, A.H., Angle, H., Poole, M.S. (Eds.), *Research on the Management of Innovation: The Minnesota Studies*. Ballinger Harper & Row, New York, pp. 221–298.
- van Stel, A., Storey, D.J., Thurik, A.R., 2007. The Effect of Business Regulations on Nascent and Young Business Entrepreneurship. *Small Bus. Econ.* 28, 171–186. <https://doi.org/10.1007/s11187-006-9014-1>
- van Weele, M., van Rijnsoever, F.J., Nauta, F., 2017. You can't always get what you want: How entrepreneur's perceived resource needs affect the incubator's assertiveness. *Technovation* 59, 18–33. <https://doi.org/10.1016/J.TECHNOVATION.2016.08.004>
- Vanacker, T., Manigart, S., Meuleman, M., Sels, L., 2011. A longitudinal study on the relationship between financial bootstrapping and new venture growth. *Entrep. Reg. Dev.* 23, 681–705. <https://doi.org/10.1080/08985626.2010.502250>
- Vanacker, T.R., Manigart, S., 2010. Pecking order and debt capacity considerations for high-growth companies seeking financing. *Small Bus. Econ.* 35, 53–69. <https://doi.org/10.1007/s11187-008-9150-x>
- Virtanen, M., Kivimäki, M., Virtanen, P., Elovainio, M., Vahtera, J., 2003. Disparity in occupational training and career planning between contingent and permanent employees. *Eur. J. Work Organ. Psychol.* 12, 19–36. <https://doi.org/10.1080/13594320344000002>
- Weber, A., Zulehner, C., 2010. Female Hires and the Success of Start-up Firms. *Am. Econ. Rev.* 100, 358–361. <https://doi.org/10.1257/aer>
- Wennberg, K., Folta, T.B., Delmar, F., 2006. A real Options Model of stepwise Entry into Self-Employment. *Front. Entrep. Res.* 26, 1–13. <https://doi.org/https://dx.doi.org/10.2139/ssrn.1310937>

- Wennekers, S., van Stel, A., Thurik, R., Reynolds, P., 2005. Nascent Entrepreneurship and the Level of Economic Development. *Small Bus. Econ.* 24, 293–309. <https://doi.org/10.1007/s11187-005-1994-8>
- Wiersema, M.F., Bantel, K.A., 1992. Top Management Team Demography and Corporate Strategic Change. *Acad. Manag. J.* 35, 91–121. <https://doi.org/10.2307/256474>
- Winborg, J., 2009. Use of financial bootstrapping in new businesses: a question of last resort? *Ventur. Cap.* 11, 71–83. <https://doi.org/10.1080/13691060802351248>
- Winborg, J., Landström, H., 2001. Financial bootstrapping in small businesses: Examining small business managers' resource acquisition behaviors. *J. Bus. Ventur.* 16, 235–254. [https://doi.org/10.1016/S0883-9026\(99\)00055-5](https://doi.org/10.1016/S0883-9026(99)00055-5)
- Winton, A., Yerramilli, V., 2008. Entrepreneurial finance: Banks versus venture capital. *J. financ. econ.* 88, 51–79. <https://doi.org/10.1016/J.JFINECO.2007.05.004>
- Wu, L.L., 2000. Some comments on "Sequence analysis and optimal matching methods in sociology: Review and prospect. *Sociol. Methods Res.* 29, 41–64.
- Zahra, S.A., Sapienza, H.J., Davidsson, P., 2006. Entrepreneurship and Dynamic Capabilities: A Review, Model and Research Agenda*. *J. Manag. Stud.* 43, 917–955. <https://doi.org/10.1111/j.1467-6486.2006.00616.x>



APPENDIX

APPENDIX

Literature Overview: Part-Time Entrepreneurship Entry

Level	Variable	Independent Variable	Control Variable
Macro	Entry Deregulation	Schulz et al. (2016)	-
	Uncertainty avoidance	Landgraf (2015)	-
	Performance orientation	Landgraf (2015)	-
	Institutional Collectivism	Landgraf (2015)	-
	Future Orientation	Landgraf (2015)	-
	Gender Egalitarianism	Landgraf (2015)	-
	Population	-	Landgraf (2015)
	GDP pp	-	Landgraf (2015)
Industry	Industry Uncertainty	Wennberg et al. (2006)	-
	Fixed Asset Ratio	Wennberg et al. (2006)	-
	Intangible Asset Ratio	Wennberg et al. (2006)	-
	Industry Leverage	Wennberg et al. (2006)	-
	Profitability	-	Wennberg et al. (2006)
	Total Size	-	Wennberg et al. (2006)
	Level of R&D Investments	-	Wennberg et al. (2006)
	Industry	-	Raffiee & Feng (2014), Petrova (2012), Bögenhold & Klingmair (2016)
Venture	Number of Employees	-	Raffiee & Feng (2014)
	Size Founder Team	-	Thorgren et al. (2016)
Entrepreneur	Education / Human Capital	Folta et al. (2010)	Raffiee & Feng (2014), Wennberg et al. (2006), (Schulz et al., 2016), Thorgren et al. (2016), Petrova (2012), Bögenhold & Klingmair (2016), Hillmann (2016), Landgraf (2015)

Literature Overview: Part-Time Entrepreneurship Entry (Continued)

Level	Variable	Independent Variable	Control Variable
Entrepreneur (Continued)	Gender	Hillmann (2016)	Raffiee & Feng (2014), Wennberg et al. (2006), (Schulz et al., 2016), Thorgren at al. (2016), Petrova (2012), Bögenhold & Klingmair (2016), Landgraf (2015)
	Age	Thorgren at al. (2016)	Raffiee & Feng (2014), Folta et al. (2010), (Schulz et al., 2016), Petrova (2012), Bögenhold & Klingmair (2016), Landgraf (2015)
	Family/Partner Income/ Wealth	Folta et al. (2010) Petrova (2012)	Raffiee & Feng (2014), Wennberg et al. (2006), (Schulz et al., 2016), Bögenhold & Klingmair (2016), Landgraf (2015)
	Married	Folta et al. (2010)	Wennberg et al. (2006), (Schulz et al., 2016), Thorgren at al. (2016), Petrova (2012), Hillmann (2016)
	Number of dependent Persons in Household	Folta et al. (2010)	Wennberg et al. (2006), (Schulz et al., 2016), Thorgren at al. (2016), Hillmann (2016), Landgraf (2015)
	Pay/Income	Folta et al. (2010)	Raffiee & Feng (2014), Thorgren at al. (2016), Bögenhold & Klingmair (2016), Hillmann (2016)
	Entrepreneurial Experience	Raffiee & Feng (2014), Folta et al. (2010)	Thorgren at al. (2016), Petrova (2012)

Literature Overview: Part-Time Entrepreneurship Entry (Continued)

Level	Variable	Independent Variable	Control Variable
Entrepreneur (Continued)	Region/Urban vs. Rural		Raffiee & Feng (2014), (Schulz et al., 2016), Petrova (2012), Bögenhold & Klingmair (2016)
	Industry Experience / Employer Tenure	Folta et al. (2010), Wennberg et al. (2006)	Raffiee & Feng (2014), Hillmann (2016)
	Parental self- employment Experience	Folta et al. (2010), Hillmann (2016)	Landgraf (2015), Petrova (2012)
	Times Unemployed	Folta et al. (2010)	Petrova (2012), Hillmann (2016)
	Partner	-	Folta et al. (2010), Wennberg et al. (2006), Thorgren et al. (2016)
	Immigrant Status	-	Wennberg, Folta & Delmar, Petrova (2012), Hillmann (2016)
	Risk Aversion	Raffiee & Feng (2014), Hillmann (2016)	-



SUMMARY

SUMMARY

Entrepreneurship in general and the creation of ventures in particular have received a lot of attention in the previous decade in the public, political and scientific debate about economic growth and the stimulation of innovation. Despite playing such a prominent role, our knowledge about the processes of venture creation is limited. The existing research on venture creation processes has advanced our knowledge by detailing single cases of venture creation or analysing specific actions entrepreneurs undertake throughout the creation of a venture. Either approach has failed to unravel overarching patterns in the central processes of venture creation. The aim of this thesis is to do just that: Explore how venture teams are commonly formed, how ventures typically acquire funding, and how ventures approach developing their products.

For this purpose, a large-scale study with 870 ventures was conducted in four European countries (Germany, Italy, The Netherlands, UK) and the US. In comprehensive interviews with the ventures' founders the processes of venture creation were tracked in great detail from the moment a founder started talking about creating a venture until the point in time a venture reached sustained profitability. The longitudinal nature of the data allows me to introduce a novel method to entrepreneurship research: Optimal matching. This methodology, unlike other methods used to explore longitudinal data, treats the entire process as the unit of analysis and is therefore particularly well suited to uncover patterns in processes. Optimal matching calculates how similar processes are to each other by counting the transformation steps it takes to transform one process into another. In a next step, the processes are clustered based on their similarity. Because the processes in each cluster will be particularly similar to each other, every cluster in turn represents one commonly occurring version of a process.

I use this methodology to explore the most central processes of venture creation: team formation, funding acquisition and product development. Based on the optimal matching results, I conclude that a finite number of approaches exists to each of these venture creation processes. Therefore, I assert that the venture creation process neither plays out in one uniform process, nor in a random order. The results also allow me to describe each of these commonly followed processes. The observed processes differ in terms of sequence of activities, process length, and whether a process is static or features transitions between different states.

With regard to the team formation processes, I observe processes in which the team in terms of number of founders, employees and service providers stagnates over time and the team remains small. On the other hand, dynamic processes of team growth exist. Interestingly, the approaches taken towards founder, employee, and service provider involvement during venture creation

partly correlate with each other. An additional effect exists between founder team size and the hiring of employees, whereas I discover substitution effects between the hiring of employees and service providers.

In terms of funding acquisition, most ventures follow processes that are adequately described in the financial bootstrapping literature. These ventures rely exclusively on the funds invested by their founders and insider equity provided by friends or family members of the founders. Ventures which acquire funding from additional sources mostly do so in the form of debt and only rarely in the form of external equity. Which type of funding a venture acquires is correlated with certain characteristics of the venture. Ventures, for example, that produce a tangible good are more likely than other ventures to acquire debt funding. The insights in this regard are largely in line with the expectations formulated in the pecking order theory on how a venture's funding needs and ability to signal quality influence the types of funding it acquires.

The majority of ventures in the dataset develops its product or service without the help of external partners. Contrary to predictions made in the organizational learning literature, those ventures that engage in external linkages with the purpose of developing their product do not first create research linkages and then market linkages. Instead, ventures form either research or market linkages. This finding indicates that nascent ventures either have limited incentives to form both types of linkages or are constrained by a lack of resources to do so.

In addition, I find that national institutions and the characteristics of a venture influence the likelihood that a venture follows a particular approach. With regard to venture characteristics, the degree of innovativeness of the product a venture develops, as well as a venture's industry consistently influence which venture creation process is chosen. Venture creation processes do not play out in a vacuum: Under different institutional frameworks entrepreneurs favour different venture creation processes to solve the coordination problems they face when creating a venture. The reliance on service providers, for example, is especially prevalent amongst nascent ventures in Coordinated Market Economies.

This thesis also sheds light on a more specific part of a founder's involvement in the creation of her venture. In the second chapter of this thesis I analyse the entry process of founders: Does a founder create a venture in part-time or in full-time? I draw on the real options theory to reason how certain characteristics of the entrepreneur, the venture and the institutional framework will influence an entrepreneur's choice between a part-time and a full-time entry. This theory tells us, that the more risky and uncertain the entry is, and the higher the entrepreneur's switching and opportunity costs are, the more likely the entrepreneur will try to reduce her risk through a part-time entry. In line with these expectations, I show that entrepreneurs are particularly likely to enter entrepreneurship in full-time when they enter entrepreneurship out of necessity.

Entering entrepreneurship out of necessity, rather than to pursue an opportunity, indicates a lack of attractive employment alternatives and therefore particularly low opportunity costs. Similarly, the analysis reveals that the composition of the team of founders influences whether an entrepreneur chooses to enter in part-time or full-time: The more part-time entrepreneurs are already working in a venture, the more likely an entrepreneur is to also enter in part-time. In a second step I analyse in how far the entry choice and the choice to transition from part-time to full-time entrepreneurship is influenced by institutions. Entrepreneurs in Coordinated Market Economies, economies such as Germany with stricter labour protection, are more cautious to forego the opportunity to earn relatively safe income through wage work. They are both, less likely to enter entrepreneurship in full-time and less likely to transition from part-time to full-time if they initial entered in part-time.

In summary, this thesis extends the existing research on venture creation processes in two ways. First, this thesis describes patterns in sub-processes of venture creation in greater detail than previous work. Second, the thesis shows that we need to take various characteristics of ventures and the venture's context into account if we want to advance our knowledge of typical venture creation processes. In other words, finding one universal venture creation process seems unlikely. Instead, and building on this thesis, identifying distinct venture creation processes for distinct types of ventures is a worthwhile goal.



SAMENVATTING

SAMENVATTING

Ondernemerschap en dan met name het starten van een onderneming ('venture creation') heeft in de afgelopen tien jaar veel aandacht gekregen in het publieke, politieke en wetenschappelijke debat over economische groei en het stimuleren van innovatie. Hoewel *venture creation* dus als belangwekkend wordt gezien, hebben we slechts beperkte kennis over de processen die hierbij spelen. Bestaand onderzoek naar deze processen heeft onze kennis vergroot door gedetailleerd in te gaan op een aantal specifieke startende ondernemingen of door te analyseren welke specifieke activiteiten ondernemers precies uitvoeren als zij een onderneming starten. Dit heeft er echter niet toe geleid dat de overkoepelende patronen in de centrale processen van *venture creation* zijn ontrafeld. Het doel van dit proefschrift is om juist dat te doen: te ontdekken hoe een ondernemingsteam meestal wordt gevormd, hoe ondernemingen meestal financiering verwerven, en welke aanpak ondernemingen gebruiken bij de ontwikkeling van hun producten.

Met dit doel heb ik een grootschalige studie uitgevoerd bij 870 ondernemingen in vier Europese landen (Duitsland, Italië, Nederland, VK) en de VS. In uitgebreide interviews met de oprichters van de ondernemingen werden de processen van *venture creation* in detail besproken, vanaf het moment dat een oprichter begon te praten over het creëren van een onderneming tot het moment dat een onderneming aanhoudend winstgevend bleek te zijn. Door de longitudinale aard van de gegevens kan ik een nieuwe methode introduceren in het onderzoek naar ondernemerschap: *Optimal Matching*. Anders dan andere methoden om longitudinale gegevens te onderzoeken, wordt bij deze methodologie het hele proces als analyse-eenheid beschouwd; daarom is zij bijzonder goed geschikt voor het ontdekken van patronen in processen. *Optimal Matching* berekent de mate waarin processen overeenkomen, door de stappen te tellen die nodig zijn om het ene proces om te zetten naar het andere. Vervolgens worden de processen geclusterd op basis van hun gelijkenis. Omdat vooral de processen binnen een cluster overeenkomst vertonen, vertegenwoordigt elk cluster op zijn beurt één veelvoorkomende versie van een proces.

Ik gebruik deze methodologie om de meest cruciale processen van *venture creation* te onderzoeken: teamvorming, het verwerven van financiering en productontwikkeling. Op basis van de resultaten van *Optimal Matching* kom ik tot de conclusie dat er een beperkt aantal manieren is om elk van deze *venture creation* processen aan te pakken. Daarom stel ik dat het *venture creation* proces niet plaatsvindt in één uniform proces en ook niet in een willekeurige volgorde. De gevonden resultaten stellen me in staat om ieder van deze gangbare processen te beschrijven. De waargenomen processen verschillen onderling wat betreft de volgorde van de activiteiten, de duur van de processen, en of een proces statisch is of niet.

Op het gebied van teamvorming heb ik processen opgemerkt waarin het team na enige tijd stagneert wat betreft het aantal oprichters, werknemers en dienstverleners en het team klein blijft. Aan de andere kant heb ik ook dynamische processen van teamgroei gezien. Het is interessant om op te merken dat er een gedeeltelijke correlatie bestaat tussen de verschillende manieren van aanpak met betrekking tot de betrokkenheid van de oprichters, werknemers en dienstverleners die worden gekozen bij het starten van de onderneming. Er is een additionaliteitseffect tussen het aantal oprichters en het aannemen van werknemers, terwijl ik ook substitutie-effecten heb ontdekt tussen het aannemen van werknemers en het inhuren van dienstverleners.

Bij het verwerven van financiering doorlopen de meeste ondernemingen de processen die adequaat worden beschreven in de financiële bootstrapping-literatuur. Deze ondernemingen zijn alleen afhankelijk van het geld dat de oprichters hebben geïnvesteerd of van kapitaal verschaft door vrienden of familieleden van de oprichters. Ondernemingen die financiering verwerven van extra bronnen doen dat meestal in de vorm van kredieten en zelden in de vorm van extern kapitaal. Welk type financiering een onderneming verwerft, hangt samen met bepaalde kenmerken van de onderneming. Zo hebben ondernemingen die een tastbaar product vervaardigen meer kans om schuldfinanciering te verwerven. De inzichten in dit verband zijn grotendeels in overeenstemming met de verwachtingen geformuleerd in de 'Pecking order'-theorie, waaruit blijkt dat de financieringsbehoefte van een onderneming en het vermogen om kwaliteit duidelijk te maken van invloed zijn op de aard van de financiering die de onderneming verwerft.

De meeste ondernemingen in de dataset ontwikkelen hun diensten of producten zonder hulp van externe partners. In tegenstelling met hetgeen er in de organisatiekundige literatuur wordt voorspeld, zoeken ondernemingen die op zoek zijn naar externe verbintenissen met het oog op de ontwikkeling van hun product, niet eerst aansluiting bij onderzoek en vervolgens bij de markt. In plaats daarvan creëren ondernemingen verbanden ofwel met onderzoek ofwel met de markt. Deze bevinding geeft aan dat startende ondernemingen ofwel slechts een beperkte stimulans voelen om alletwee die verbanden te vormen ofwel worden beperkt door een gebrek aan middelen om dit te doen.

Daarnaast heb ik ontdekt dat de nationale instellingen en de kenmerken van een onderneming van invloed zijn op de waarschijnlijkheid dat een onderneming een bepaalde aanpak volgt. Ook blijkt dat de keuze voor een bepaald *venture creation* proces wordt beïnvloed door de mate waarin het product innovatief is en door de industrie waarin de onderneming actief is. *Venture creation* processen spelen zich niet af in een vacuüm: in verschillende institutionele kaders geven ondernemers de voorkeur aan verschillende *venture creation* processen om de coördinatieproblemen op te lossen waarmee zij geconfronteerd worden bij het starten van hun onderneming. Zo speelt de afhankelijkheid van dienstverleners vooral bij startende ondernemingen in gecoördineerde markteconomieën.

In dit proefschrift probeer ik ook licht te werpen op een specifiek aspect van de betrokkenheid van de oprichter bij het starten van de onderneming. In het tweede hoofdstuk van dit proefschrift analyseer ik het toetreden van oprichters: is de oprichter vanaf de start part-time of full-time betrokken bij de onderneming? Ik put hiervoor uit de theorie van de reële opties om te beredeneren hoe de keuze tussen part-time en full-time betrokkenheid wordt beïnvloed door bepaalde kenmerken van de ondernemer, van de onderneming en van het institutioneel kader. Deze theorie vertelt ons dat hoe riskanter en onzekerder het starten is, en hoe hoger de overstap- en opportuniteitskosten zijn, hoe groter de kans is dat de ondernemer het risico probeert te verminderen door part-time toe te treden tot de onderneming. In lijn met deze verwachtingen laat ik zien dat het bijzonder waarschijnlijk is dat ondernemers full-time toetreden als zij dit uit nood doen. Als een onderneming wordt gestart uit noodzaak in plaats van omdat iemand een gat in de markt ziet, wijst dit op een gebrek aan aantrekkelijke werkgelegenheidsalternatieven en dus op bijzonder lage opportuniteitskosten. Ook blijkt uit de analyse dat de samenstelling van het team van oprichters van invloed is of een ondernemer ervoor kiest om part-time of full-time toe te treden: hoe meer part-time ondernemers er al in een onderneming werken, hoe groter de kans dat een ondernemer besluit om ook in deeltijd toe te treden. In een tweede stap analyseer ik in hoeverre deze keuze en de keuze om over te stappen van part-time naar full-time ondernemerschap worden beïnvloed door instellingen. Ondernemers in gecoördineerde markteconomieën met een strenge arbeidsbescherming, zoals Duitsland, zijn minder geneigd om de mogelijkheid op te geven om een relatief veilig inkomen te verwerven in loondienst. Ze zijn zowel minder geneigd om als full-time ondernemer te starten als om over te stappen van part-time naar full-time.

Dit proefschrift breidt het bestaande onderzoek naar *venture creation* processen op twee manieren verder uit. In de eerste plaats worden patronen in de sub-processen van *venture creation* in meer detail beschreven dan hiervoor. Ten tweede wordt in dit proefschrift aangetoond dat, als we onze kennis van de typische *venture creation* processen willen vergroten, we rekening moeten houden met de verschillende ondernemingskenmerken en met de context van de onderneming. Met andere woorden, het vinden van een universeel proces van *venture creation* lijkt onwaarschijnlijk. Met dit proefschrift als basis is het waardevol om vast te stellen wat de verschillende *venture creation* processen zijn voor de verschillende soorten onderneming.



ACKNOWLEDGMENTS

ACKNOWLEDGMENTS

Like the creation processes of the ventures that I explore in this thesis, the writing of this thesis required the combination of three types of resources: funding, knowledge and a team.

The funding of my thesis project was largely provided by the EU Horizon 2020 project 'FIRES'. I am grateful to Mark Sanders who lead the project expertly and everybody else who made this project a success.

A lot of people contributed knowledge and expertise to this thesis. First and foremost, I would like to thank my supervisor Andrea for your unwavering support throughout the four years. I appreciate the countless hours you spent guiding my writing, discussing the peculiarities of optimal matching and for dealing with the nuisances of collecting such a large dataset. Koen, thank you for always asking the right questions when I got stuck and keeping the overall goal in sight when the schedule got tight in the last year. A special thank you to my co-authors, Allard, Cornelia and Friedemann. Your expert knowledge allowed me to dive into different literature streams for each of my chapters.

A large team of colleagues, friends and family helped me in many different ways to reach the finish line. I immensely enjoyed working at the Copernicus Institute and appreciate the constructive atmosphere and the inspirational people working here. Half way through my PhD I asked my eventual *paranimfen* Hade and Arnoud if I could take up the free desk in their office – maybe the best decision of my PhD. Sharing everything from the ups and downs of PhD life, to the latest Hip Hop tracks, rice waffles, business ideas (BuurtBike) and VivPods – the DHW board room was a source of delight and inspiration! Every Tuesday Matthew would enrich our discussions with his unique stories and gadgets.

Chris – it was a pleasure to go through the PhD together with you from beginning to end. Our coffee break discussions and your enthusiasm for entrepreneurship helped me keep going when I hit a bump in the road. Maryse and Jaap thank you for helping me to get over some of these bumps when they were methods related. Several other colleagues reminded me that a life outside the office exists: saving the world from dangerous viruses with the ONIU group (Allard, Joeri, Kevin, Mart), discussing greener spaces and finding the best Roti restaurants with Sander, bike rides with Iris, tennis matches with Toon and enjoying the Utrecht nightlife with Denise, Deyu, Dorith, Jarno, Karla, Simona and others provided welcome breaks from papers and R scripts. I would be amiss if I didn't thank the excellent staff at Copernicus that made dealing with the bureaucratic side of academia a lot easier: Thank you Annemarieke, Harmina, Hümeyra and Inneke.

Another group of people that made settling in Utrecht a lot smoother and more enjoyable were my housemates in the Grasstraat. Games of Risk, house dinners, Reggaeton sessions, table tennis tournaments and walks to Roberto's turned the Grasstraat into a real home. Een speciale dank aan Peter en Myrthe die na drie maanden samenwonen hebben geweigerd om Engels met mij te blijven praten en zo mijn Nederlanders op een goed pad hebben gebracht.

While becoming more integrated in the Netherlands, friends from Germany made sure I didn't forget my roots. Celebrating carnival, going on vacations to Portugal, Greece or Birresborn and countless weekend trips to Cologne always left me refreshed (and with a pinch of homesickness). One person who deserves a special thank you is my high school friend Bobbi. Bobbi was my partner in crime for my India (Someday), Iceland and Iran adventures. Thank you for all the great talks on life goals, ECG and finding one's way!

Der größte Dank aber geht an meine Familie: Meine Eltern Susanne und Hejo, meine Schwester Laura. Ihr wart immer für mich da und habt mich in allem unterstützt was ich gemacht habe. Der Stadtwald ist immer ein Ruhepol für mich und ein Ort großer Wärme.

Last, but certainly not least, I want to thank the person who supported me the most in the stressful times of my PhD: Geerte. Your love and support kept me balanced when my mind didn't stop running in the last months. You gave me comfort and created room for short escapes. I am looking forward to our next adventures!



CURRICULUM VITAE

CURRICULUM VITAE

Lukas Held was born on 23rd September 1986 in Bonn (Germany). In 2010, he obtained a Bachelor of Science in Business Administration from the University of Münster (Germany). He spent the following year working in the Corporate Strategy Department of the Otto Group in Hamburg (Germany), as well as volunteering for a conservation project close to Auckland (New Zealand).

Lukas continued his academic education at the University of Cologne (Germany) and the Rotterdam School of Management (Netherlands), where he obtained a Master of Science in Corporate Development and the CEMS Master in International Management (2014). After concluding his studies, he was awarded a scholarship by the DAAD (German Academic Exchange Service) to work as an economic advisor at the German Embassy in Kathmandu (Nepal).

In January 2015, he began his PhD at the Innovation Studies Group of the Copernicus Institute of Sustainable Development at Utrecht University (Netherlands). For the following four years, Lukas researched venture creation processes in multiple countries as a member of the FIRES project. The FIRES project was an EU Horizon 2020 project which developed reform proposal to encourage an entrepreneurial society in Europe.

During his PhD he also served as a marketing advisor for India Someday, a travel agency for cost-effective, yet personalized trips to India. Furthermore, Lukas got involved in the Dutch chapter of the Economy for the Common Good initiative. This initiative encourages economic actors to prioritize the common good over profit.

