



MASTER'S THESIS

What drives Business Model Transformation in Small and Medium Sized Enterprises?

Empirically assessing the Roles of Business Environment and Strategic Agility

May 2016

Julian Kutscha

Double Degree Program M.Sc. Innovation Management and Entrepreneurship M.Sc. Business Administration

Supervisors: (1.) Dr. Michel Ehrenhard (2.) Dr. Kasia Zalewska-Kurek (External) Dipl.-Ing. Erik Steinhöfel





Abstract

In recent years, firms are experiencing challenging shifts in their business environments. Technological developments and changing patterns of customer demand severely shorten the live spans of the prevailing business models. In order to survive and expand in such turbulent environments, firms must constantly question their established routines and processes. However, small and medium sized enterprises (SMEs) are alarmingly unaware of the business model concept and dedicate little attention to business model innovations (BMIs). As a starting point to overcome this challenge, it is crucially important to accurately identify both, the environmental factors that necessitate business model changes, and the internal firm capabilities to conduct them.

By referring to the Dynamic Capabilities View (DCV) literature as well as to the largely case study driven literature stream on business model innovations, the study in hand recognizes seven potential influence factors for business model transformations in incumbent SMEs. To empirically verify these factors, an internet-mediated, quantitative survey among executive managers of 89 German SMEs (net response rate: 10.80%) was conducted. Subsequently, the resulting data was analyzed using a Partial Least Squares Regression (PLS-R) approach to handle multicollinearity related problems.

The results indicate that four factors, namely, Strategic Sensitivity, Resource Fluidity, Market Turbulence and Technological Turbulence, are significantly related to the degree of Business Model Innovativeness for at least one size class of firms (differentiating micro, small and medium sized firms). Given the lack of quantitative studies in the field, this thesis contributes to the literature by supplying empirical findings that are not limited to certain cases or specific industries. Also, the originality of this work is expressed by the fact that it is the first to empirically conceptualize environmental turbulence in the context of business model innovation.

Contents

1	Intr	Introduction			
2	Theoretical Framework				
	2.1	The Business Model Concept	9		
		2.1.1 Defining the term "Business Model"	11		
		2.1.2 The Situation of Business Model Research	14		
	2.2	Business Model Innovation and Transformation	15		
	2.3	The Specific Situation of Small and Medium Sized Enterprises	18		
	2.4	Environmental Drivers for Business Model Change	20		
	2.5	Dynamic Capabilities for Business Model Change: Strategic Agility	30		
3	Methodology				
	3.1 Sampling				
	3.2	Data Collection	37		
	3.3 Measurement of latent variables				
		3.3.1 Measuring Environmental Turbulence	38		
		3.3.2 Measuring Strategic Agility	39		
		3.3.3 Measuring Business Model Innovativeness	40		
	3.4	Data Analysis: Partial Least Squares Regression	43		
4	Rest	ılts	47		
	4.1	Response rate and external validity	47		

4.2 Model Correlations and Regression Results	49
5 Discussion and Conclusion	54
Appendix A Survey Items	58
Appendix B List of NACE codes	61
Appendix C Detailed PLS-Regression Results	63
Bibliography	65

List of Figures

1	The business model environment framework based on Schallmo and Brecht, 2010	23
2	Graphical summary of the theoretical framework	34
3	Depiction of the indirect modeling technique of PLS-R, based on Tobias, 1999.	46
4	Summarized coefficients of the partial least squares regression analyses	51

List of Tables

1 Literature Review on Driving Forces for Business Model Innovation in I				
	bents	27		
2	Response rates	47		
3	Distribution of firm characteristics	48		
4	Means, standard deviations, cronbach's alpha (post correction) and correlations			
	of model variables	50		
5	Significance patterns of the OLS and PLS regression results (across size classes)	52		

1. Introduction

The growing momentum of the concept of business models is representative for the increasingly hard challenges today's businesses are facing in a constantly changing environment. As research has recognized, a lot of firms are currently seizing opportunities by implementing novel ways of doing business, while at the same time entire industries are declining due to changing environmental constraints (as, i.e. in the newspaper industry). In order to adjust to the fundamental shifts they are confronted with, firms may need to reconfigure their assets and activities, produce different products or find novel ways of selling and purchasing. In a nutshell, they need to change their business model.

Most large corporations are reportedly aware of the significance of the business model concept for firm success and survival (Martins et al., 2015). However, small and medium sized enterprises posses little knowledge and expertise regarding the processes to innovate their business model and preferably stick to traditional models. As repeatedly shown by case studies, sticking to established and conventional ways of doing business in an environment that is characterized by technological development, turbulent markets and changing customer preferences bears an increasing risk of growing obsolescent.

As SMEs constitute up to 99% of firms in most industrialized economies, and are responsible for the majority of employment, such struggles pose a significant economic risk (Eurostat, 2015). Picking up on that problem, the European Commission lately initiated academic efforts to develop tools and methods that support SMEs in transition to novel business models.

In order to support firms to actively embrace the opportunities of change, research needs to understand both, the environmental changes, which impose the necessity for business model transformations and the firm capabilities that enable the planing and implementation of such changes. Business model research, although increasingly great in amount of publications, has not yet assessed these factors comprehensively. In fact, it was driven by a few prominent case studies to a considerable extent (Clauß and Hock, 2015). Therefore, research in this field so far somewhat missed to provide generalizable findings for the majority of businesses.

Complementary to the existing research, this study therefore wants to examine the different influence factors necessitating business model transformations as well as the capabilities to conduct them. Hence, the research objective is, based on theoretical considerations and analysis of empirical data, to identify and confirm the main drivers of business model transformations and adjustment in incumbent Small and Medium Sized Enterprises.

More specifically, this thesis seeks to answer the following research question:

What are the antecedents of business model transformation in incumbent SMEs?

- (a) regarding external influence factors from the business environment?
- (b) regarding internal firm capabilities?

From an academic point of view, this thesis also is of value as it comprehensively includes environmental factors, that have not previously been assessed in the context of business model research, while also recognizing the Dynamic Capabilities View. Hence, it contributes to the connection to other streams of literature, addressing a frequent critique of business model research. By examining the antecedents of business model transformations, it builds a much needed foundation for the development of more sophisticated methods that guide SMEs on their transformation process.

These contributions without doubt are implicitly relevant for practitioners. In addition, the findings will precisely show which capabilities are essential when conducting business model transformations. This may constitute a starting point for managers to actively develop and reinforce certain competences.

The remainder of this thesis structured as follows. First, as a starting point the main theoretical constructs are explained and discussed based on an academic literature review. Based on this, two groups of hypotheses are developed and introduced. Then, the methodology and techniques applied in the survey and in the statistical analysis are presented. Finally, the results are displayed, discussed and evaluated.

2. Theoretical Framework

Starting with a clarification of the foundational concepts, this chapter depicts the theoretical framework of the subsequent empirical study. To do so, the existing literature is reviewed in a narrative fashion, in order to identify and include the main contributions for the concerned topics. As the research in some of these fields still is an emergent phase, the review is not systemically limited to certain keywords or phrases, in order not to exclude or miss any important findings (Bryman and Bell, 2015). However, a systematic literature analysis is complimentarily applied for a distinct purpose in section 2.4. After that, the hypotheses for the subsequent empirical part of this theses are developed and presented.

2.1 The Business Model Concept

As Osterwalder et al., 2005 note, the first application of the term "business model" in an academic article has to be attributed to Bellmann et al., 1957, while Jones, 1960 was the first to publish an academic paper featuring "business model" as part of its title. However, the meaning of the term back then still was quite different from today's understanding, as both publications referred to it in order to describe methods of teaching technology to business students (DaSilva and Trkman, 2014).

Since the mid-1990s the academic interest in the concept (Lindgren, 2012; Lambert and Davidson, 2013; Osterwalder et al., 2005; Zott et al., 2011), and the public use alike (Ghaziani and Ventresca, 2005), have sharply increased. Consequently the amount of academic contributions addressing business models skyrocketed in recent years (Klang et al., 2014). Illustrating the growing popularity, in 2013 the first academic journal dedicated to business model research

came into being (Nielsen et al., 2013). Since the development of the concept is connected to the technological development of the Internet and the related rise of technology based companies (Zott et al., 2011; Osterwalder et al., 2005), its academic considerations originate from the fields of entrepreneurship, e-business (Timmers, 1998) and information systems theory (DaSilva and Trkman, 2014). Other drivers for its popularity include the emerging knowledge economy, outsourcing of business activities and the restructuring of the financial industry (Teece, 2010). Casadesus-Masanell and Ricart, 2010 note that the need for new strategies to address emerging markets and the "bottom of the pyramid" additionally fueled the interest in the field.

Up to now, the business model has become an important point of reference in general management research (Lambert and Davidson, 2013). Casadesus-Masanell and Ricart, 2011 even claim that in the future, it is likely to supersede strategy as a starting point in the quest for sustainable advantage. Alongside academic research, the concept is in wide use among practitioners. As the business model is a core enabler for firm performance (Taran et al., 2015), it comes as no surprise that nowadays a majority of executives label the development of new business models a strategic priority (Martins et al., 2015). In fact, companies actively begin to compete through their business models (Casadesus-Masanell and Ricart, 2010).

Underlining the practical importance of a sophisticated business model design, Teece, 2010 state that technological innovation alone rarely leads to commercial success. Instead, he suggests that every product development effort should be paired with an appropriate business model design process, in order to define fitting strategies for value capturing and marketing. Referring to a case of a technology based start-up, Zott and Amit, 2010 declare that the design of the business model is crucially important to successfully capitalize on the innovation. Similar conclusions are drawn by Chesbrough and Rosenbloom, 2002 in a case of an incumbent firm that employs transformations on its business model. Confirming such anecdotal information, a quantitative empirical study by Wei et al., 2014 finds that the type of business model needs to fit with the type of technological innovation to enable optimal firm growth. Wei et al., 2014 therefore conclude that technological innovation on its own does not guarantee business success.

2.1.1 Defining the term "Business Model"

As depicted, the important role of the business model concept in enhancing the general firm performance and concerning the process of capturing value from technological innovation becomes increasingly known among practitioners. Consequently, various methods and tools evolved, which support business model design and corresponding decision making. Even though early contributions, such as Amit and Zott, 2001, refer the business model as a tool for only descriptive purposes, Shafer et al., 2005 add that it is used for analysis, implementation and communication of the respective company's strategic choices. Consistent with that, Demil and Lecocq, 2010 differentiates two distinct uses of the business model concept: static and transformational. That is, the business model is either employed as a blueprint to establish coherence between the core business model components, or it addresses change and innovation within the organization. Doganova and Eyquem-Renault, 2009 show that the business model not only acts as a narrative, but also as a calculative device, that contributes to market exploration and innovation activities. In contrast to that, Eckhardt, 2013 stresses that a business model is typically not articulated mathematically and can comprise a greater variety of factors than mathematical equations possibly could.

However, the academic work with the concept suffers from the lack of a commonly accepted definition (George and Bock, 2011; Zott et al., 2011; DaSilva and Trkman, 2014; Teece, 2010). Porter, 2001 states that the term business model "seems to refer to a loose conception of how a company does business and generates revenue". A lot of researchers have reacted to this problem by collecting and contrasting definitions from various academic articles (e.g. Zott et al., 2011; Morris et al., 2005; Schneider and Spieth, 2013; Schallmo and Brecht, 2011; Klang et al., 2010; Ahokanagas and Myllykoski, 2014). Zott et al., 2011, based on a literature review, even claims that "business model" currently is not one but many concepts, as researchers from different domains use it to explain different phenomena. In this regard, Gladwin et al., 1995 note that conceptual disagreement is to be expected in the emergent phase of any big idea.

The missing consensus concerning the business model concept is connected to its development in a variety of academic fields, such as information systems theory, entrepreneurship and strategic management. Research involving the concept thereby took place in largely isolated silos, slowing down cumulative approaches significantly (Zott et al., 2011). Besides, the lack of consensus was fostered by the diversity of contexts and the resulting range of possible application areas in practice (Lambert, 2003; Günzel and Holm, 2013). Ahokanagas and Myllykoski, 2014 argue that the business model concept can only become fully comprehensible by conceptually connecting it to its business context. Also, Zott and Amit, 2010 recognize that only a minority of researchers actually referred to the work of other scholars when defining the concept. Often, no definition is given at all, as the authors rely on the implicit understanding of the term.

Despite all dissent and discussion, most authors seem to agree to a minimal definition, which simply describes the term "business model" by its syntactical components "business" and "model" (Taran, 2011). In particular, scholars recognize that a business model somehow refers to an abstract description (that is, a model) of how an organization does business. Concerning more sophisticated approaches, Martins et al., 2015 note that in recent years business model researchers increasingly adopt an activity systems based view (Zott and Amit, 2010). Zott and Amit, 2009 claim that such a view is consistent with the various approaches within the literature and thereby may act as common ground for further research. Following the activity systems approach, a business model is regarded as an architecture of organizational activities of the focal firm, consisting of various components as well as of linkages between these components (Afuah, 2001). In this regard, an activity refers to the engagement of all human, physical and capital resources to the business model (Zott and Amit, 2009). The activity system does not only comprise activities performed within the focal firm, but may also include activities that are conducted by its partners, customers or vendors (Zott and Amit, 2009). As Zott and Amit, 2010 elaborate, the activity systems perspective encourages systematic thinking and offers rich possibilities for further refinement. Therefore, for the remainder of this thesis, a business model

is defined in accordance to Zott and Amit, 2010 as a system of interdependent activities of a focal firm.

Concerning the content of a business model, Günzel and Holm, 2013; Ahokanagas and Myllykoski, 2014 find that a majority of practitioners and researchers agree that a business model comprises descriptions of the respective firm's value creation, value capture and value delivery processes. By combining the structure (system of activities) and the content (value creation, capture and delivery), the business model concept allows for a connection of abstract strategic decisions to their practical implementation (Ahokanagas and Myllykoski, 2014).

In order not to add any more confusion to the topic, it is crucial to be aware of the current level of abstraction when talking about business models. Osterwalder et al., 2005 differentiate three hierarchically ordered levels to categorize the use of the term. The foundation form abstract definitions in the sense of the above, which are also referred to as business model concepts. One level higher, recurring business model types are situated. Finally, "business model" may also refer to specific, real world instances. Similarly, Baden-Fuller and Morgan, 2010 discriminate between scale models and role models. While a scale model, just as a business model type, only depicts specific components of a real world object, a role model refers to a tangible company, which serves as a best practice example.

Building on their activity systems based view of the business model Zott and Amit, 2010 identify four distinct business models types (Osterwalder, 2004). That is, they differentiate four design themes based on the configuration and orchestration of their respective business model elements. According to this perspective, a successful business model either adapts a novelty-centered, efficiency-centered, lock-in based or complementaries based approach (Zott and Amit, 2010). Kesting and Günzel-Jensen, 2015 also adds a sophistication based variant. Other authors have described different business model types. For instance, Baden-Fuller and Haefliger, 2013 elaborated on the "free usage model", while Chesbrough and Rosenbloom, 2002 identified the so called "razor and razor blade" business model type. Also, for certain industries, such as the field of e-business, specific classifications were created (see e.g. the 4C Net business model

framework by Wirtz et al., 2010, the current business models by Timmers, 1998 or the business models of the Net Economy by Kollmann, 2006).

2.1.2 The Situation of Business Model Research

Given the fuzziness and missing consensus of the concept, it comes as no surprise that the relation of business model and strategy are part of a debate (Umbeck, 2009). In their review of business model research (Klang et al., 2014) identify the relation of the business model concept to strategy as a recurrent theme in the academic literature. While some scholars do not even rigorously differentiate between the two, the majority of researchers perceives them as distinct but interrelated concepts (Klang et al., 2014). Teece, 2010 states that a firm's business model compared to it's strategy is a more generic concept. He emphasizes that both, business strategy analysis and business model design is required in order to gain and sustain competitive advantage. In line with Teece, 2010, Casadesus-Masanell and Ricart, 2010 hold the view that selecting a strategy is a more specific choice and therefore the chosen strategy dictates the choice of the business model. Hence, the business model is regarded as a manifestation of a firm's realized strategy.

Despite the recent rise in popularity of the business model concept, it is not free from critique. Many scholars note the lacking theoretical grounding in business studies or economic theory (Zott et al., 2011; Teece, 2010) and criticize its inconsistent definitions (Porter, 2001; Shafer et al., 2005). In Addition some scholars criticize that while the concept is highly emphasized in practice and widely perceived as useful, the acknowledgement of the term in mainstream academic journals remains too low (Baden-Fuller and Morgan, 2010; Morris et al., 2005). Klang et al., 2014 note that such critique often creates "paradoxical tensions" as it is expressed by authors who at the same time state high expectations and underline the potential promises of the concept. Such tensions can hamper the development of the academic discourse in promising directions (Lewis, 2000).

Regarding the situation of business model research, Clauß and Hock, 2015 recognize that up to now it is extensively driven by case analysis, which contribute to the understanding of the term business model. In their meta-review of empirical research in the field Lambert and Davidson, 2013 find that 73% of analyzed studies were concerned with the understanding of the business model concept itself. Therefore, only a small number of articles makes use concept as a tool for other purposes such as verifying existing management models. Clauß, in press notes that while early work in business model research addressed the definition of the concept and its differentiation from related concepts such as strategy, later work focused on case specific analysis. Hence, up to now large-scale quantitative empirical studies hardly exist in this field of research.

2.2 **Business Model Innovation and Transformation**

Even though a business model usually represents just a snapshot in time and does not include planning of future changes (Kamprath et al., 2014), it can not be understood as permanently given (Chesbrough, 2007). Taran et al., 2015 notes that the life spans of today's prevailing business models have shortened due to increasing global competition. However, most firms rarely question their existing business model (Taran et al., 2015) and instead tend to develop business models of increasing stability and rigidity over time (Doz and Kosonen, 2010).

In fact, business models can be subject to innovation (Zott et al., 2011; Baden-Fuller and Haefliger, 2013). In recent years, the topic received increased attention, due to notable cases of firms that generated immense returns through newly developed business models (Euchner and Ganguly, 2014). Similar to product or process innovation, the degree of innovativeness of a Business Model Innovation (BMI) can be categorized from incremental to breakthrough (Enkel and Mezger, 2013). Kim and Min, 2015 differentiate a BMI based on the source of the innovation: imitative (new to the firm) or original (e.g. new to the entire industry).

As the concept of BMI builds on the understanding of the Business Model as described above, the problems of inconsistency and missing consensus apply as well (Schneider and Spieth, 2013; Nizar et al., 2013). Nevertheless, scholars agree that as the business model defines the fundamental mechanisms of how the enterprise works, a Business Model Innovation changes

the way companies "are doing business" beyond operational details (Nizar et al., 2013). From an activity systems perspective this change comprehends a reconfiguration of components to new courses of action (Bock et al., 2012). This may include changes in the internal organization and even in company culture (Leih et al., 2015).

Martins et al., 2015 link the different perspectives on Business Model Change to the core theoretical schools in Strategy Research. Thus, a company's business model can either be regarded as a result of purposeful adjustment to external conditions, complying to the rational positioning school, as result of experimentation and trial-and-error learning as in the evolutionary school or as a result of the boundaries to managers' mental models, as in the cognitive school.

For firms, pursuing business model innovation can be beneficial in terms of growth prospects and competitive advantage (Taran et al., 2015; Clauß and Hock, 2015). A study by Pohle and Chapman, 2006 found that the operating margin of business model innovators grew 5% faster compared to their competitors. Interestingly, the same measure for product, market or service innovators came down to 0%. Confirming these findings, Giesen et al., 2007 empirically showed that financially outperforming firms emphasized business model innovation twice as much as under-performers. Teece, 2010 states that the BMI itself can establish competitive advantage, if the model is sufficiently hard to replicate and differentiated. While emerging industries certainly offer opportunities, BMI also enables firms to gain competitive advantage in mature markets (Sosna et al., 2010).

However, performing BMI is not a trivial task. Business model innovators do not only adjust their strategic positioning, but rather exploit non-intuitive business opportunities that only become obvious in retrospect (Bock and George, 2014). Hence, BMI seems more complex than product or process innovation (Schneckenberg et al., 2016).

The process of business model innovation in incumbents and entrepreneurial entrants differs considerably (Schneckenberg et al., 2016). For entrepreneurial entrants, BMI represents the design of novel business models in order to exploit a certain business opportunity. In this case, the business model represents the link between the entrepreneurial evaluation of the opportunity

and its exploitation in practice (Fiet and Patel, 2008). Contrastingly, incumbents are engaged with reconfiguring existing models in order to adapt to change or to exploit opportunities outside their core market (Günzel and Holm, 2013). Accordingly, Ahokanagas and Myllykoski, 2014 differentiate between business model creation and business model transformation. They note that "there is an experiential and time difference between the original creation of the business model and its subsequent transformation or change — even though the basic idea of the business model as a concept remains the same".

Unlike entrepreneurial entrants, incumbents are faced with special challenges when performing business model innovation. While in general start-ups could easily transform their model, incumbents have to handle the redeployment of assets and the re-engineering of positions (Leih et al., 2015). Also, as the transformation to a new type of business model often implies a limited time of coexistence of both models, ambidexterity is required. Therefore, managers have to handle possible trade-offs between the original and the new model, since the latter may be incompatible with the firm's existing organization, activities or logic (Markides, 2006). The transformation process can even require cannibalizing the existing model (Teece, 2010). Intensifying this difficulty, firms also have been found to experiment with several new business models at once (Trimi and Berbegal-Mirabent, 2012). Ahokanagas and Myllykoski, 2014 state that in such situations relationship conflict may arise. In addition, incumbents are at risk of making potentially misleading or dangerous decisions, as their decision-making process may be impaired by cognitive or structural constraints (Schneckenberg et al., 2016). Such constraints include an insufficient understanding of the structure and the inter-dependencies of the existing model, as well as dominant logic and path dependencies (Chesbrough, 2010; Demil and Lecocq, 2010). As a consequence to the above difficulties, incumbents often prefer to apply incremental forms of business model transformation over radical ones (Ahokanagas and Myllykoski, 2014).

2.3 The Specific Situation of Small and Medium Sized Enterprises

What particularly constitutes a Small or Medium sized Enterprise (SME) can be defined by a range of factors, including number of employees, sales volume or age (Rahman, 2001). However, the limits differ across countries and organizations (for an overview see Ayyagari et al., 2003). The European Commission for instance, limits a SME to 250 persons, 50 million euro annual turnover and 43 million euro balance sheet total (European Commission, 2005).

In most economies, SMEs have an important role as engine for growth and employment. As of 2012, in the European Union a total of 99.8% of firms fell within the defined SME boundaries, while being responsible for 67.0% of employment (Eurostat, 2015). In general, research considers the SME sector as a key driver and source of innovation and new product development (Wynarczyk et al., 2013). Given the sheer amount of SMEs, they represent an essential component of national as well as regional economic development and international competitiveness (Wynarczyk et al., 2013). However, only a small proportion of SMEs is actually accountable for the majority of innovative product development and wealth creation (Brown et al., 2014).

In contrast to large companies, SMEs have to cope with several restrictions regarding tangible as well as intangible resources. This comprises limitations of management and manpower as well as finance Hudson et al., 2001. Consequently, small and medium sized enterprises have only limited access to human capital skills and knowledge (Rogers, 2004). As a result, in-house research and development activities are often prevented by resource restrictions (Verhees, Frans J. H. M. and Meulenberg, 2004). Also, SMEs invest significantly less in training events for their employees, even though such events are of great value in adapting organizational and technological innovation (Antonioli and Della Torre, 2016). Lubatkin, 2006 find that SMEs also face significant challenges when implementing organizational ambidexterity, as the top management team has to carry out both, exploitative (operational) and explorative (strategic) tasks. Therefore, SMEs' strategies tend to be rather informal and dynamic (Hudson et al., 2001; Singh et al., 2008). Even though strategies are not the same as business models, these are interrelated concepts (Klang et al., 2014). Informal strategies in general are considered a major threat to firm survival (Wheelen and Hunger, 1999).

The advantages of SMEs are primarily behavioral, as smaller firms posses a greater responsiveness to changing circumstances and entrepreneurial dynamism (Rothwell and Dodgson, 1994). As SMEs tend to be organized with little devolution of authority, they feature flat and flexible structures (Hudson et al., 2001). According to Chesbrough, 2010 the position of the single owner-manager is ideally suited to initiate Business Model Innovations, as he or she possesses the firm wide decision authority. Confirming this view, Bock and George, 2014 as well as Leih et al., 2015 stress that business model changes represent far-reaching strategic issues for which the management team is jointly accountable in a top-down fashion.

While Bock and George, 2014 argue that business model innovation is not significantly driven by firm size, other research suggests that SMEs are in a unique position concerning BMI. Halecker et al., 2014 investigate the relevance of particular types of innovation for different firms based on managerial perception. They find that BMI is perceived slightly more relevant in larger companies and that, accordingly, SMEs less often implement a specific process for BMI. Consequently, Lindgren, 2012 find that SMEs pursue business model innovation rather blindly and in general lack business model innovation skills (e.g. they do not explicitly formulate a BMI leadership strategy). As a result, SMEs are often unable to capitalize upon market opportunities (Lindgren, 2012).

Facing the challenge of weak BMI skills in SMEs, the European Commission dedicated several calls within the Horizon 2020 program for research and technological development to help SMEs overcoming obstacles in the business model innovation process. Specifically, funding is awarded for solutions that "enable SMEs [...] to innovate and grow across traditional boundaries, through new business models and organizational change" (European Commission, 2014).

In conclusion, focusing the research on Small and Medium Sized Enterprises is a fruitful endeavor, due to three distinct reasons. Firstly, given the flexible organizational structure, SMEs

hold a great potential to transform in a rapid and radical way. Secondly, the essential position of SMEs in most economies implies a tremendous impact of progress achieved within the research field. Finally, SMEs have a huge demand of BMI skills, as they need to catch-up with larger companies and thereby keep and advance their strategic position within today's turbulent environment.

2.4 Environmental Drivers for Business Model Change

The notion of business environments and corresponding response has been examined in various fields of research, including strategic management (Porter, 1980) and organizational theory (Hambrick, 1982). Building on the existing literature base, the influences of changes in the business environment on the business models of firms are investigated in this section. That is, the main environmental driving forces of business model changes are identified.

Putting it differently, the current section aims to uncover the main drivers for business model transformations, with respect the micro as well as the macro business environment. By making use of the business model environment framework by Schallmo and Brecht, 2010 a number of factors is identified and matched with existing literature reviews on the topic. The remaining factors are then confirmed by conducting an analysis of case studies from the business model literature. Notably, this method limits the selection of antecedents of business model change to those generally relevant for any kind of firm and those already recognized by previous academic contributions. While the transition to another type of business model in reality involves a wide range of influence factors, which may only apply to a certain type of firm or a specific industry, this study focuses on general influence factors that every firm, to a certain extent, is exposed to.

When it comes to describing and analyzing business models, most of the frameworks in use (e.g. the Business Model Canvas by Osterwalder, 2004) only depict the internal components of the focal firm at a single point in time (Reuver et al., 2009). Hence, the current research tends to ignore both, the relationship of the business model to the business environment and the transformation of the model over time (Kamprath et al., 2014). In line with these findings, Ahokanagas

and Myllykoski, 2014 state that a major part of the existing literature neglects the role of the business context and rarely discusses the process aspects of the business model concept. Also, they conclude that up to date no coherent contextual perspective has been presented within the research stream. In order to understand the inter-dependencies between a firm's business model and the surrounding business ecosystem, Zott and Amit, 2013 emphasize the need to adopt a more systemic perspective. In fact, the business model relates the firm to its external business environment, customers, competitors, and even society (Teece, 2010).

As nowadays firms are more and more confronted with radical changes in their environment (Wirtz et al., 2010) and have to adopt or "calibrate" (Teece, 2010) accordingly, the significance of such a systemic perspective becomes apparent. Doz and Kosonen, 2010 state that due to an intense global competition and "in the face of discontinuities and interruptions" firms need to adapt and transform in a more radical, rapid and frequent way compared to the past. Pointing in the same direction, Voelpel et al., 2004 add that the high pace of major and unpredictable changes of the business environment as well as a constant need for innovation pose a challenge for incumbent business models. The relationship of the business model to its business context is dynamic and, accordingly, business models require regular assessment and subsequent adjustment to remain competitive (Ahokanagas and Myllykoski, 2014). Zott and Amit, 2013 add that in situations of rapid changing environments, the success of a firm seems to depend on the fit between its business model and the surrounding business ecosystem to a great extend.

In fact, business model changes are often forced to incumbents by innovations originally introduced by their competitors. That is, in reality, firms more often act as innovation-takers, rather than innovation-makers (Ghezzi et al., 2015). Once a business model innovation is introduced by an innovative entrant, incumbents may choose to borrow that model to remain competitive (Casadesus-Masanell and Zhu, 2013). Ghezzi et al., 2015 criticize that the current literature largely focuses on endogenous business model innovation, detracting attention from the great impact of such imposed changes.

However, a few authors examined the business model adaption processes in greater detail. Teece, 2010 established the concept of "business model learning" to describe the process of adjustment to a new type of business model already introduced by a competitor. On a more general level, other researchers refer to "business model renewal" (Doz and Kosonen, 2010), "business model evolution" (Demil and Lecocq, 2010) or "continuous morphing" (Rindova and Kotha, 2001) as a process of constant adoption to environmental changes. McGrath, 2010 points out that especially successful incumbents are at risk of "business model erosion", as they may miss to react to changing environmental constraints in time.

To illustrate the process of adaption, Teece, 2010; Euchner and Ganguly, 2014 instance the case of "Blockbuster Online", an online DVD rental service launched by the incumbent US based company Blockbuster LLC. The introduction of such as service apparently was a defensive move of reaction to the upcoming streaming based business model of Netflix, which has changed the customer's expectations concerning pricing and availability. In addition, Blockbuster came under pressure by the advancing internet technologies and the resulting obsolescence of DVD rental services. This example vividly demonstrates how a successful incumbent was forced to change its model by an innovative entrant and finally suffered from business model erosion (McGrath, 2010) as it was not able to cope with changing technological constraints.

Even though the academic knowledge about the specific impact of such environmental changes to business models is rather small, a range of approaches to conceptualize the external business environment and its driving forces already exists in the current literature. In order to extend our understanding of business model changes and to identify the specific factors that cause such changes, it is crucial to take the existing conceptualizations into account.

As one of the most notable approaches, Michal E. Porter's "five forces" framework represents a conceptualization of the micro environment of an industry (Porter, 1980). By listing five factors that influence an industry's competitive intensity, Porter, 1980 provides a tool to assess an industry's attractiveness, which is equal to its profit potential. The five competitive forces -Threat of New Entrants, Bargaining Power of Buyers, Threat of Substitute Services, Bargaining Power of Suppliers and Rivalry Among Existing Competitors - represent important aspects to consider in strategy formulation and development. Porter, 2008 emphasizes that the framework



Figure 1: The business model environment framework based on Schallmo and Brecht, 2010

is universally applicable, regardless of the type of industry (low-tech or high-tech) or the type of economy (emerging or developed).

As a counterpart on the macro environmental side, the so called PEST analysis (including its derivatives STEEP, PESTEL and others) is highly popular among practitioners (Burt et al., 2006). Emerged in the mid-1970s, the PEST analysis takes into account political, economic, social and technological factors in order to enable strategic decision making (Burt et al., 2006). While this approach fosters the inclusion of institutional factors as part of the analysis (Gnatzy and Moser, 2012), it is criticized for supporting the notion of a static and invariable environment (Burt et al., 2006).

Strengthening the importance of a joint analysis of micro as well as macro environmental factors, Schallmo and Brecht, 2010 develop the so called business model environment framework. As depicted in figure 1, the model makes use of the PESTEL drivers and the five forces approach by Porter, 1980. Schallmo and Brecht, 2010 state that both, micro and macro environment impact the customer needs, which form the basis for business model development.

In the business model literature, however, a few factors from the above frameworks are assumed to be specifically correlated with business model changes. Osterwalder, 2004 recognizes micro as well as macro environmental elements as influence factors towards the business model design. Particularly, on the micro environmental site, he states that competitive forces - that is, e.g. dynamic competitors entering the market - constitute a threat to the incumbents' business models and therefore induce business model changes. Also, changing patterns of customer demand, such as fashion changes, affect existent business models. Regarding macro environmental aspects, Osterwalder, 2004 points out technological change as a major driver of business model change, since "technology is increasingly applied to every aspect of business". Notably, the rise of the internet is referred to as an important challenge for incumbent business models. Finally, Osterwalder, 2004 adduces shifts in the social or legal environment, such as the introduction of new laws or social values within a society.

Based on a literature analysis of existing case studies, Reuver et al., 2009 basically confirm the theoretical work by Osterwalder, 2004, as they identify changing market-related, technological and regulatory conditions as drivers for business model change. Similarly, Teece, 2010 state that changing markets, technological factors and legal structures call for business model changes, as firms need to align with their environment in order to survive.

As shown, the previous work on environmental drivers in the field of business model research generally suggests that turbulence in certain micro as well as macro environmental conditions positively influences the propensity for business model innovation. This is in line with earlier work by Aldrich and Pfeffer, 1976, who found that high levels of environmental turbulence generally induce changes in firms' strategies.

In previous work on the market orientation concept, Jaworski and Kohli, 1990 summarized three constructs from the literature, representing business environmental factors that influence the behavior and success of firms - namely, Market Turbulence, Competitive Intensity and Technological Turbulence. Surprisingly, these concepts have not attracted the attention of business model researches yet. Although, they are largely similar to the previously mentioned factors by Osterwalder, 2004 and have been applied in a range of empirical studies in other fields (e.g. Slater and Narver, 1994; Chen et al., 2016; Santos-Vijandea and Álvarez-González, 2007). Therefore, considering these factors as drivers for business model innovation is not only sup-

ported by the existing literature, but also enables the researcher to draw upon rich existent empirical results as well as upon approved measurement methods.

Market Turbulence refers to changes in the composition of customers and in the customer's preferences (Jaworski and Kohli, 1990; Slater and Narver, 1994). Greenley, 1995 additionally includes changes in the corresponding marketing operations into the construct, while Santos-Vijandea and Álvarez-González, 2007 even state that market turbulence does not only comprise market dynamism (changes in clients and competitors) but also market uncertainty (difficulties in predicting future environmental developments). According to Kraus et al., 2012, highly innovative firms are found to perform better in situations with high levels of market turbulence. Contrastingly, Hult et al., 2004 did not find support for this relationship.

As another micro environmental influence factor, Jaworski and Kohli, 1990 apply the level of Competitive Intensity. The construct describes the managerial perception of the extent of competition in the market (Mahapatra et al., 2012). Situations of strong competition alter the behavior of firms, as their activities become less deterministic and more heavily influenced by the movements of their competitors (Auh and Menguc, 2005). Interestingly, Zahra, 1993 implicitly refers to business model changes, by declaring that in situations of high competitive intensity "companies must innovate in both products and processes, explore new markets, find novel ways to compete, and examine how they will differentiate themselves from competitors".

Technological Turbulence is considered as a crucial influence factor from the macro environmental site. It refers to the rate of technological change within a certain industry, which may arise from increased investments in R&D and production capabilities (Slater and Narver, 1994). Candi et al., 2013 found that firms that perceive a high level of technological turbulence are more likely to incorporate flexible strategies in order to adapt to external changes. As demonstrated in the previously described example of Blockbuster (Teece, 2010) or in the case of the turbulent dot-com era (Wang, 2006), technological turbulence may cause market turbulence.

Apart from the above conditions, Osterwalder, 2004; Reuver et al., 2009; Teece, 2010 point out that changes in the legal and regulative structure are predecessors of business model change. While regulatory turbulence is not incorporated in the factors by Jaworski and Kohli, 1990, it is included in the environmental forces scale of Dwyer and Welsh, 1985 and was repeatedly used as a construct in empirical studies as well (e.g. Chi and Sun, 2013; Cadogan et al., 2001). Regulatory Turbulence refers to the stringency of environmental regulations and to the level of fluctuation among such rules over time (Wijen and van Tulder, 2011).

This investigation of environmental drivers for business model innovations so far has revealed that for each of the supposedly most relevant factors from the BMI literature, a matching and more sophisticated construct already exists in other fields. However, this outcome is not quite surprising, as the development of business model related theories commenced from different, isolated silos and the missing connection to other fields of research is a frequent critique (Zott et al., 2011). Nonetheless, overcoming this obstacle is crucial to advance empirical research in the field of business model innovation.

In order to build a common ground for the subsequent empirical study and possibly for future research, a literature analysis of recent years' relevant academic papers was performed. Therefore, every entry of the *Web of Science Core Collection* database¹, which featured the term "business model innovation" in either its title, abstract or keywords, published after 2008, was scanned through. Earlier academic contributions were included in the analysis by Reuver et al., 2009. Articles that were found to contain empirical information or case studies about environmental pressures that force an incumbent firm to innovate or at least modify its existing business model were analyzed in greater depth and classified according to the main driver in one or more of the following categories: Market Turbulence, Competitive Intensity, Technological Turbulence and Regulatory Turbulence. As the business model literature in general is very rich in case studies (Clauß and Hock, 2015), this method allows to reinforce the previously derived theoretical assumptions ahead of the subsequent empirical study. Therefore, the purpose of the analysis is explicitly not to review every given paper in the field or even to substitute later verification processes, but only to support hypothesis building.

¹The *Web of Science* academic citation indexing service is a commercial product of the *Thomson Reuters Corporation*.

Author & Year	Industry	Type of Article	Description of mayor driver	Type of driver	
Gsodam et al., 2015	Austrian Electric Power Producers	Qualitative Interviews	Political Pressure and introduction of subsidies	RT	
Sivertsson and Tell, 2015	Swedish Agriculture Industry	Qualitative Interviews	Market concentration	CI	
Ghezzi et al., 2015	Mobile Network Operators	Multiple Case Studies	Convergence of Internet and Mobile Technology / Changing distribution paradigm (mobile application store)	TT, CI	
Khanagha et al., 2014	Telecommunication Industry	Longitudinal Case Study	Introduction of Cloud Technology	TT	
Bowyer and Chapman, 2014	International Airport Operators	Case Study	Privatization of the Industry	RT	
Bohnsack et al., 2014	Car Manufacturing Industry	Qualitative Analysis	Development of Electronic Vehicles	TT	
Chang et al., 2014	Taiwan Travel Industry	Single Case Study	Rise of Internet and E-Commerce platforms	TT	
Zolnowski et al., 2014	German Retail Industry	Single Case Study	Introduction of a mobile payment solution	TT	
Richter, 2013	German Electric Power Producers	Qualitative Interviews	Governmental decision to transition to renewable energy sources	RT	
MT = Market Turbulence, CI = Competitive Intensity, TT = Technological Turbulence, RT = Regulatory Turbulence					

 Table 1: Literature Review on Driving Forces for Business Model Innovation in Incumbents

Continued on next page

Author & Year	Industry	Type of Article	Description of mayor driver	Type of driver	
Heikkilä and Heikkilä, 2013	Manufacturing / Health	Multiple Case Studies	Change in customer needs due to various influence factors	MT	
Holm et al., 2013	Danish Newspaper Publishers	Multiple Case Studies	Spread of the Internet	TT	
Lv and Liu, 2012	US Retail Industry	Single Case Study	Competitors engaging in E-Commerce	TT, CI	
Sosna et al., 2010	Spanish Diatry Industry	Single Case Study	Reinforced competition due to market deregulation	RT, CI	
MT = Market Turbulence, CI = Competitive Intensity, TT = Technological Turbulence, RT = Regulatory Turbulence					

As the results in table 1 indicate, the literature analysis confirmed previous theoretical work by Osterwalder, 2004; Reuver et al., 2009; Teece, 2010. Specifically, for each of the supposed drivers of business model innovation, at least one academic contributions was found which acknowledges and confirms its respective relevance.

Since these drivers are comprehensively supported by the theoretical framework, but have not been explicitly confirmed by quantitative empirical work yet, the following hypotheses are presented for further verification.

- [H1] The higher the degree of Market Turbulence, the higher the degree of Business Model Innovativeness.
- [H2] The higher the degree of Competitive Intensity, the higher the degree of Business Model Innovativeness.
- [H3] The higher the degree of Technological Turbulence, the higher the degree of Business Model Innovativeness.
- [H4] The higher the degree of Regulatory Turbulence, the higher the degree of Business Model Innovativeness.

Notably, the hypotheses do not refer to business model innovation in a discrete manner (meaning: it either is present or it is not), but instead incorporate that BMI occurs in different, continuous levels of radicalness (Enkel and Mezger, 2013). By doing so, this research is able to relate the magnitude of the environmental shift to its consequential response. This is particularly important, as the process of business model transformation is regarded as an appropriate adjustment to external changes (Doz and Kosonen, 2010).

2.5 Dynamic Capabilities for Business Model Change: Strategic Agility

As previously described, the necessity for business model transformation is mainly derived from changes in the business context. However, such transformations do not happen as a direct, automatic consequence of environmental shifts. The academic literature suggests that in addition to external drivers, particular - dynamic - capabilities are necessary to successfully perform BMI.

Dynamic capabilities comprise high-level capabilities, which a company utilizes to orchestrate its resources to meet the current and expected needs of the market (Leih et al., 2015). They enable the organization to capitalize on identified market opportunities, adjust business processes and models with respect to the business environment and even to shape the business environment to their desire (Teece et al., 1997). Putting it differently, Barreto, 2010 describes dynamic capabilities as the "firm's potential to systematically solve problems, formed by its propensity to sense opportunities and threats, to make timely and market-oriented decisions, and to change its resource base". Leih et al., 2015 therefore express that dynamic capabilities are foundational to business model innovation. Over the last two decades the dynamic capability view (DCV) grew to become one of the leading frameworks to identify the sources of long-term firm survival, growth and enterprise-level competitive advantage (Wilden et al., 2016; Teece, 2007). Following this perspective, the dynamic capabilities govern the development, enhancement and combination of the organization's ordinary capabilities (Leih et al., 2015).

The complementary ordinary or operational capabilities that allow a firm to "make a living" in the short term (Winter, 2003) may include routines and collective activities for new product development, quality control, knowledge transfer, and performance measurement (Eisenhardt and Martin, 2000). Ordinary capabilities therefore enable a firm to produce and sell a predefined and static set of products or services (Leih et al., 2015).

Notably, Barreto, 2010 find that the environmental conditions under which dynamic capabilities are beneficial to the firm are part of a debate within the research field. While early research (e.g. Teece et al., 1997) claims that such capabilities are solely useful in rapidly changing and turbulent environments, later findings (e.g. by Zahra et al., 2006) indicate a more general applicability that also includes rather stable environments. After extensively analyzing the literature, Di Stefano et al., 2010 conclude that dynamic capabilities support organizations to gain competitive advantage regardless of the level of turbulence.

Greatly related to the dynamic capabilities concept, in the early 1990s the notion of agility arose in the context of manufacturing research (Fayezi et al., 2014). From there, its focus eventually spread to other academic fields, such as strategy research (Doz and Kosonen, 2008). Nowadays, agility itself is commonly recognized as a particular set of dynamic capabilities (Meredith and Francis, 2000; Chiang et al., 2012; Tavani et al., 2013). As Leih et al., 2015 state, the dynamic capabilities of an organization determine its agility and flexibility in implementing new organizational design. Thus, agility currently refers not only to manufacturing operations (DeVor et al., 1997) but is also considered an important concept regarding firm survival and sustainability questions (Gunasekaran, 1998) and adjusting to opportunities in times of turbulent markets (Sharifi and Zhang, 1999).

A review of 27 selected agility definitions in the academic literature by Fayezi et al., 2014 contrasts the different approaches to define the term "agility" from the manufacturing, organizational and supply chain perspective. Fayezi et al., 2014 find that while some authors, such as Fliedner and Vokurka, 1997, define agility as a company's ability to produce and market a wide range of low-cost high-quality product in a flexible manner, others, like van Hoek et al., 2001, describe the concept as "centered on responsiveness to dynamic and turbulent market and customer demand". Going in the same direction Sharifi and Zhang, 1999 argue that pro-activeness and responsiveness towards changes in the industry as well as opportunity exploitation are the main factors of agility. Kidd, 1994 emphasizes a company's ability to quickly adopt in situations of uncertainty and change. An agile organization therefore can be generally described as a firm that effectively adapts to a disruptive environment (Weber and Tarba, 2014). Bock and George, 2014 state that agile firms are rapidly shifting between opportunity exploration and exploitation. Also, concerning BMI, Bock and George, 2014 vividly describe that while "BMI

is like jumping off a mountain; agility is the hang glider that helps the firm choose where to fly and land".

Building on the Agility concept, as well as the Dynamic Capability View, Doz and Kosonen, 2008 introduced a specific framework of capabilities, coined *Strategic Agility* (SA), that create an "infrastructure for change" (Ganguly et al., 2009). Doz and Kosonen, 2008 claim that firms, which embrace strategic agility, are able to make strong strategic commitments but at the same time also have the awareness, flexibility and will to adapt these commitments as it is required by the business environment. Clauß and Hock, 2015 note that SA represents a conceptualization of the capabilities through which BMI occurs. They add that the meta capabilities of SA are in line with recognized approaches from the DCV literature (e.g. Teece, 2007; Teece, 2010), as they incorporate the notion of sensing, seizing and reconfiguration skills.

Similarly to the approach of Doz and Kosonen, 2008, Weber and Tarba, 2014 see two major requirements for strategic agility. On the one hand, a strategically agile company needs to have sensing abilities in order to identify the direction for change. On the other hand a corresponding leadership style and organizational design is necessary to implement the structural adaption of the firm.

Given today's turbulent market environment, the advantages of the ability to switch the course of action become apparent (Lewis et al., 2014). Especially in cases of high competitive intensity, volatile markets and fast changing environments, strategic agility is advised as it enables firms to remain competitive (Grewal and Tansuhaj, 2001; Shin et al., 2015; Lewis et al., 2014) or even recognize and exploit new market opportunities (Morgan and Page, 2008). While companies previously used to make long term plans and strategies to defend their competitive position, today, agility and constant adapting is preferable (Brown and Eisenhardt, 1998). Hamel and Breen, 2007 stresses that the main challenge of modern management is to keep the balance between freedom and discipline. Therefore, firms must "become as strategically adaptable as they are operationally efficient" (Hamel and Breen, 2007). Confirming theory by Overby et al., 2006, in their empirical study Ayub et al., 2014 find that Strategic Agility has a significant and positive impact on organizational performance.

The Strategic Agility construct currently represents the most comprehensive framework of capabilities for business model innovation available in the literature and builds upon the popular dynamic capability view. Also, it has already proven its empirical applicability (Clauß and Hock, 2015). Hence, it serves as an adequate foundation to formulate the following hypotheses, which complimentarily match those of the previous section and consider the capabilities for BMI instead of the necessities.

As the first component of Strategic Agility, Doz and Kosonen, 2008 introduce *Strategic Sensitivity*. That is, an organization needs to pay high attention to strategic developments and external changes, in order to become aware of rising opportunities and threats timely (Doz and Kosonen, 2010). Similarly, drawing on the resource based view, Teece et al., 1997 emphasize the importance of the ability to sense market changes to be able to reconfigure the firm's asset structure. As it seems intuitively reasonable as well as theoretically well grounded to assume that firms need to sharpen their foresight and sensitivity to market developments to adjust their business models accordingly, it is hypothesized that:

[H5] The higher the degree of Strategic Sensitivity, the higher the degree of Business Model Innovativeness.

The meta capability *Collective Commitment* describes the ability of the top management team to make fast and bold decisions and communicate the new goals throughout the organization. As fundamental changes often require risky personal adjustments and involve "gut wrenching decisions", the unity of the leadership team is essential (Doz and Kosonen, 2008; Doz and Kosonen, 2010). Once the firm decided to pursue a business model change, this capability is required in order to put it into practice. As expressed by the following hypothesis, Collective Commitment therefore constitutes a crucial capability for Business Model Transformations.

[H6] The higher the degree of Collective Commitment, the higher the degree of Business Model Innovativeness. *Resource Fluidity* refers to the internal capability of an organization to reconfigure its resources rapidly, based on business processes or people management approaches (Doz and Kosonen, 2008). Likewise, Teece et al., 1997 stress the importance of internal processes that allow for effective and efficient change. Firms that are able to quickly reconfigure their assets may conduct business model changes at a considerably lower cost. Therefore, it is hypothesized that:

[H7] The higher the degree of Resource Fluidity, the higher the degree of Business Model Innovativeness.



Figure 2: Graphical summary of the theoretical framework

3. Methodology

3.1 Sampling

To enable the generalizability of results on the entire population, adequate sampling is substantial (Saunders et al., 2009). As this study attempts to draw conclusions about the German Small and Medium sized Enterprise sector, the sampling frame is required to represent the characteristics of this specific population as good as possible. Since a comprehensive list of all possible participants does not exist and cannot possibly be obtained with reasonable effort, the study must rely on available databases.

Hence, the *Hoppenstedt* firm directory¹ was chosen as a starting point to build the sampling frame, as it contains more than 300.000 data sets of German firms, including information on industry affiliation, amount of employees, amount of turnover per year and names of the executive managers. The Hoppenstedt directory is among the most comprehensive databases of German firms and consequently it was frequently used in empirical studies of various fields (see e.g. Kollmann and Stöckmann, 2014; Swoboda and Olejnik, 2016; Decker and Mellewigt, 2012). Nevertheless, when referring to databases as sampling frames, one has to take into account that the sample is potentially biased by inaccurate and incomplete data as well as by out of date entries (Edwards et al., 2007).

As the Hoppenstedt directory does not only contain information on small and medium sized companies, but also on a few large ones, it was necessary to exclude those from the sample

¹The *Hoppenstedt* firm directory is a commercial product of *Bisnode AB*. Access to the directory was made available via the *Berlin University of Applied Sciences for Engineering and Economics*.

frame. Therefore, entries of firms, which did not fall within the 250 employees limit set up by the SME definition of the European Commission (European Commission, 2005) were ignored.

Also, it was considered that companies that do not operate under normal market conditions, such as providers of public services, should not be included either. As such companies presumably react substantially different to environmental influence factors, it was concluded that the analysis of non market conform companies does not allow for generalizable results regarding other SMEs.

To achieve this distinction, the respective firm's NACE industry classification code² was evaluated. The NACE code, which fortunately was provided with every database entry, assigns the company to a particular branch of industry. In order to exclude certain branches, the study borrowed those 2-digit NACE industry categories, which for the same reason were found eligible to participate in the German section of the Community Innovation Survey, carried out by the Centre for European Economic Research (ZEW). It was ensured that only companies of these industries constitute the sample frame (a comprehensive list of the included branches can be found in Appendix B).

Finally, as advised in the case of electronically accessible data, simple random probability sampling was employed (Saunders et al., 2009). Unfortunately, it is neither possible to randomly draw single data sets from the *Hoppenstedt* database, nor is it feasible to filter by certain criteria as requested.

Therefore, I developed a small-scale software application for this specific purpose. The application, which was build as an extension to the web browser, downloaded directory entries on the basis of randomly generated values by itself. Subsequently, the data was automatically filtered by examining the stated firm size and industry. This way, a representative selection of participants was achieved, while at the same time assuring that the respective firms fulfill the defined criteria.

²NACE is an acronym for the french term *nomenclature statistique des activités économiques dans la Communauté européenne* (Statistical Classification of Economic Activities in the European Community)
This way a total of 865 managers were addressed, from which 89 successfully participated in the survey. Further evaluations of the response rate and discussions of validity issues are to be found in section 4.1.

3.2 Data Collection

Using the obtained data, a self-administered, internet-mediated questionnaire was conducted among the executive managers (who frequently are also the owners) of small and medium sized enterprises. Based on the Hoppenstedt information, invitation mails were send out to the respective firm's executive manager's address, containing his or her name in the mail's subject line (e.g. "personal invitation for Mr. Jon Doe"). This way it was ensured that the participants were knowledgeable in the field of interest and thereby the risk of uninformed response was reduced. Invitations to participate in the survey were send out via email, while the actual questionnaire was located on a website, to which they were provided a link. As unique one-time keys were used to access the survey website, the participants were prevented from answering the survey more than once. Nevertheless, it was possible for the participants to abandon the survey and continue in a later stage.

Besides the names of owners and managers of the respective firms, the *Hoppenstedt* data includes an e-mail address for each record. However, the vast majority of records only contains a generic email address, such as "info@company.com" or "office@company.com". As it is highly recommended to personally address the participants of a survey to increase motivation and response rate (Heerwegh, 2005), additional addresses were generated based on the participant's name. That is, similarly to the approach of Schlüter, 2009; Sill, 2008; Knollmann, 2007, for each participant, multiple combinations of first name and last name were generated in order to guess the correct address (e.g. "firstname.lastname@company.com") or "f-lastname@company.com"). In addition to the given generic email address, invitations to the survey were sent out to the generated addresses as blind carbon copy (BCC).

While email surveys have a range of advantages, such as a low probability for a socially desirability bias (Dillman et al., 2007) and a high chance of reaching the legitimate participant (Saunders et al., 2009), a low response rate is a common weakness (Michaelidou and Dibb, 2006; Saunders et al., 2009). Therefore, several best practice measures were applied to motivate the participants and thereby increase the response rate.

Besides personally saluting every single participant (Heerwegh, 2005), this included a well crafted questionnaire design as well as a slight incentive. As described in sub-section 3.3.3 in greater detail, the participant was able to receive an individually computed value indicating the level of business model innovativeness for their particular firm.

More specifically, the historic data obtained by the latest CIS series of 2012 allowed for a grading and comparison with national and industry specific averages. At the final page, the participants were presented with a bar chart displaying the instantly computed result of their company's degree of business model innovativeness alongside the average of their specific industry and the national cross-industry reference value. Notably, this incentive is only of significant value to the informed respondent, as others would not be able to judge their firm's BM innovativeness correctly.

3.3 Measurement of latent variables

In order to empirically verify the previously presented hypotheses, adequate measurement methods for the independent as well as dependent variables have to be defined. The remainder of this section therefore discusses the advantages and shortcomings of different approaches before finale selecting the scales to be used in the subsequent questionnaire survey.

3.3.1 Measuring Environmental Turbulence

As illustrated in section 2.4 the environmental turbulence framework by Jaworski and Kohli, 1993 features a sophisticated operationalization in the form of questionnaire items. These items have been applied in an overwhelmingly great amount of empirical studies (e.g. Pelham, 1999;

Menguc and Auh, 2006; Vorhies et al., 2009; Subramanian and Gopalakrishna, 2001 just to refer a few). As to be found in Appendix A, for each of the respective turbulence constructs Jaworski and Kohli, 1993 developed a set of 5 to 6 reflective items that were assessed on a 5-point Likert scale.

As for the regulatory turbulence construct, however, the academic literature still lacks a sufficient measurement method. The only notable approach in this regard is the Regulatory Turbulence scale developed by Cadogan et al., 2001, based on Dwyer and Welsh, 1985. However this approach to a large extent focuses on the comparison of international export market characteristics and therefore is not suitable to assess the regulatory differences firms in a single country face in their respective industries.

Hence, for the purpose of measuring regulatory turbulence correctly, two reflective survey items have been introduced. Based on the definition by Wijen and van Tulder, 2011, participants were asked to rate their perceived level of regulatory turbulence, while examples of such regulatory changes from the scale of Dwyer and Welsh, 1985 were provided alongside. Similarly to the scales of Jaworski and Kohli, 1990 the evaluation was performed using 5-point Likert scales (again, for a list all questions asked see Appendix A).

3.3.2 Measuring Strategic Agility

With regard to the Strategic Agility concept presented in section 2.5, Weber and Tarba, 2014 claim that so far little has been done to operationalize the concept. However, a few item scales are actually available in the literature. As one possible approach, the agility scale developed by Tallon and Pinsonneault, 2011 measures the managerial perception concerning the firm's ability to respond to environmental shifts in due time. The approach, which was also adopted by Idris and Al-Rubaie, 2013, incorporates the focal company's capability to quickly perform reactions in case of product launches, quality improvements or price changes in the market. Although this basically constitutes a valid method to measure Strategic Agility, it was not employed in this study, since it does not feature the three distinct dimensions introduced by Doz and Kosonen, 2008 and thus does not allow the verification of the corresponding hypotheses (H5 - H7).

Contrarily, the survey items developed by Clauß and Hock, 2015, which were applied in this study, are based on Doz and Kosonen, 2008 and therefore particularly consider these different dimensions (Strategic Sensitivity, Collective Commitment, and Resource Fluidity). This solution consists of three reflective measurement items per dimension and was initially employed in a study that relates organizational culture to BMI. By testing the indicator and composite reliability, as well as the convergent and discriminant validity, Clauß and Hock, 2015 were able to confirm the applicability of their instrument, as all tests achieved results well above their respective threshold value.

For the sake of completeness, it should be noted that yet another Strategic Agility scale was employed by Oyedijo, 2012; Ofoegbu and Ankabi, 2012, which unfortunately was not made publicly available.

3.3.3 Measuring Business Model Innovativeness

In contrast to the measurement approaches applied for the independent variables, selecting an adequate scale to assess the level of business model innovativeness is a more complex task. As empirical research about the BMI phenomenon still is rather scarce, research has not yet established standard measurement techniques for this specific case. Nevertheless, a few approaches exist.

Perhaps most notably, Zott and Amit, 2007 developed a survey instrument in order to distinguish novelty-centered business models from their efficiency-centered counter parts. Building on Miller, 1996, they suggest that innovation and efficiency represent two dichotomous strategic choices in the design of business models. The same survey items were used by Zott and Amit, 2008 in an attempt to examine the relationship between the business model design theme and the product market strategy. However, the subsequent empirical work does not make use of it, due to the following reasons. Firstly, the goal of the research neither is to discriminate between two distinct design themes, nor to assess the novelty of specific business model elements. Instead, the study requires a method to accurately measure the proportion of changes in the business model, in order to relate it to the amount of environmental changes, as well as the level of BMI relevant capabilities.

Secondly, the questionnaire of Zott and Amit, 2007 is build on the assumption that the respondent possesses prior knowledge concerning the nature of the business model concept. For instance, the participant is explicitly asked to evaluate to which degree their companies' business models are generally considered as 'novel'. Taking for granted the readers understanding of such a controversial concept may even cause misconceptions in the academic discussion. As the majority of SMEs lacks decent BMI skills (Lindgren, 2012), asking the participants in such an explicit manner seems unsuitable for the proposed study.

As another approach worth noticing in this regard, the questionnaire used by Huang et al., 2014; Huang et al., 2012 features four items and a 7-Point-Likert scale. In contrast to the previous approach, it attempts to measure BMI by evaluating specific firm capabilities. This includes questions about the firm's ability to set up a development process for new business activities and to acquire the necessary resources.

While this may be a reasonable measurement method under some circumstances, considering the proposed theoretical framework, it is not a suitable approach to asses the level of business model innovativeness in this case. In fact, BMI related capabilities are already present as explanatory variables. The verification of the presented hypotheses requires that the dependent variable represents actual changes in the business model instead of only the capabilities to do so.

For the same reason the scale used by Clauß and Hock, 2015 was rejected. Furthermore, the academic literature contains a few attempts to measure BMI that are only suitable for one specific industry, such as the bond trading market (Velu, 2015) or the manufacturing industry (Cucculelli and Bettinelli, 2015). Others, such as Ding et al., 2013 do not even reveal their questionnaire.

Finally, the approach adopted in this study was developed by Waldner et al., 2015. By borrowing items from the community innovation survey of the European commission, they developed a measurement instrument that plausibly evaluates the subject of interest and at the

same time allows for comparison with historical data. The CIS comprises a number of harmonised investigations concerning the innovation activities of businesses and are carried out by the national statistical offices of the member states of the EU. Waldner et al., 2015 reviewed the extensive list of CIS questions, in order to identify those that potentially ask for BMI relevant information. Subsequently, they consulted three experts of the BMI field, who were found eligible for their theoretical as well as practical work with the concept. The experts were asked to rate the propounded CIS questions with regard to the amount of information the item contains on BMI.

Based on the aggregated ratings, Waldner et al., 2015 eventually introduce three different sets of CIS questions, all of which achieved sufficient scores in the inter-rater reliability tests. The sets contain 7, 11, and 18 polar questions (yes/no questions), respectively, and were initially applied to relate industry structure to BMI. The subsequent empirical work will make use of the 11 item version, as it was considered to have the optimal ratio of comprehensiveness and answer time required (for an overview of the questions, see Appendix A). That is, content-wise the items cover all significant areas previously listed, namely, value creation, value capture and value delivery (Günzel and Holm, 2013; Ahokanagas and Myllykoski, 2014). Consequently, each of the different items asks for other aspects of the comprehensive BMI construct. It is therefore regarded as a formative instead of a reflective measurement model.

Compared to the previously described methods, this approach does not explicitly ask for a grading of the BM innovativeness and thus it does not expect the respondent to posses any prior knowledge about the concept. Instead, it relies on the approved items of the CIS to identify concrete modifications in the most relevant business model elements. As previously mentioned, this approach also was used to incentivize the participant by displaying the results alongside averages.

3.4 Data Analysis: Partial Least Squares Regression

As a measure of data analysis, *Partial Least Squares Regression* (PLS-R) is applied. Hence, this section describes the advantages and limits of this specific technique and explains why it is a particularly suited method to asses the obtained data. Also, the advantages of PLS-R over the more commonly used *Ordinary Least Squares Regression* (OLS) are discussed.

PLS-R was initially presented by Wold, 1975 on the basis of the earlier developed NIPAS algorithm for the field of econometrics. Later, it gathered great attention in chemometrics (Abdi, 2010) and was also used in ecology (Carrascal et al., 2009) and related fields. In sociology and business studies, however, another "partial least squares culture" (Vinzi et al., 2010) called partial least squares path modeling (PLS-PM) is significantly more prevalent (Vinzi et al., 2010). Nevertheless, PLS-R has been successfully applied in a couple of organizational, marketing and finance related studies (Zheng and Wang, 2011; Nokels et al., 2010; Laitinen, 2006; Aâkouk, 2006; Graber et al., 2002).

One of the key advantages of PLS regression is that it implicitly handles multicollinearity. Hence, it allows for the computation of valid results even though the input variables may be noisy and correlated with each other. Contrarily, other regression techniques, such as OLS, require the linear independence of input factors. Farahani et al., 2010 found that PLS-R is superior to OLS in situations of small sample size, missing data and multicollinearity. In line with these findings, the study of Adnan et al., 2006 confirmed that PLS-R is a well suited measure to cope with multicollinearity related problems.

In conventional linear regression models (OLS), the presence of multicollinearity in the data set leads to less precise parameters and wider confidence intervals. Therefore, the more multi-collinearity, the less interpretable are the parameters (Adnan et al., 2006). Adnan et al., 2006 also list a range of specific problems that are caused by multicollinearity, such as incorrect regression coefficients and inadequate t-tests. By contrasting OLS and PLS-R on a data set of highly multicollinear input factors, Graber et al., 2002 demonstrate how the significance patterns of the respective results differ. While the PLS-R solution correctly reveals the significance

of the different predictor variables (compared to the case of the bivariate Pearson correlation), the standard OLS results are substantially worse. Using OLS regression, the researcher would reject variables, which are actually adequate predictors. Hence, the researcher would fall for a type II error.

Given the presented theoretical framework, a few reasons apply to *a priori* anticipate multicollinearity in the obtained data set. Firstly, as mentioned earlier, Technological Turbulence is theoretically assumed to cause Market Turbulence in some situations (Teece, 2010; Wang, 2006). Also, earlier empirical work using the environmental turbulence scales by Jaworski and Kohli, 1990 repeatedly found significant ($p \le 0, 05$) correlations between Market Turbulence and Technological Turbulence (Pelham, 1999; Menguc and Auh, 2006; Vorhies et al., 2009), Market Turbulence and Competitive Intensity (Subramanian and Gopalakrishna, 2001; Menguc and Auh, 2006; Vorhies et al., 2009), and Technological Turbulence and Competitive Intensity (Menguc and Auh, 2006; Vorhies et al., 2009). However, the correlations vary in different samples. As for the last relationship ($TT \leftrightarrow CI$) for instance, Pelham, 1999 analyzing a crossindustry sample of 229 SMEs, did not detect a significant correlation, while Menguc and Auh, 2006 found such support in a sample of 242 large manufacturing firms. As a side note, it would be interesting for future research to investigate the exact relationships among the independent variables of the theoretical framework.

Furthermore, it seems intuitively reasonable to assume that in situations of environmental turbulence, firms may eventually develop capabilities, such as Strategic Agility, to cope with the circumstances. Looking at it the other way around, in turbulent times, non-agile firms may file for bankruptcy more probably, which creates a kind of survivor bias that possibly reinforces the correlation.

Hence, the obtained data set most certainly contains severe collinearity between a number of independent variables. The use of PLS-R, therefore, is a sensible solution. Martens, 2001 notes that compared to competing approaches, PLS-R is constantly among the best regression methods in terms of both, statistical predictability, and ease of use, as it enables nonstatisticians-researchers to focus on their contextual knowledge, rather than having to learn statistical methods in detail.

As the technique of PLS-regression is relatively uncommon, especially in the field of business research, the remainder of this section represents a short introduction into the mathematical processes carried out during a PLR-R.

In the univariate case of PLS-R, K explanatory (independent) variables, labeled $x_k(k = 1, 2, ..., K)$, are processed to predict a single or multiple Y-variables. Firstly, the K variables in X are compressed into fewer latent variables, also referred to as score vectors, $T = [t_a, a = 1, 2, ..., A]$ that summarize the most relevant information of X. To compute T from X the - usually linear - function W(.) is applied (Martens and Martens, 2000).

$$T = W(X) \tag{3.1}$$

$$U = W(Y) \tag{3.2}$$

Hence, t_a is considered a linear combination of x_k . Given the *T*-variables, *X* and *Y* can be expressed similar to Principal Component Analysis (PCA) as

$$X = \sum_{a=0}^{A} t_a p^T{}_a + E$$
(3.3)

$$Y = \sum_{a=0}^{A} u_a p_a^T F$$
(3.4)

which may be rewritten as

$$X = TP^{\top} + E \tag{3.5}$$

$$Y = UQ^{\top} + F \tag{3.6}$$

where P and Q represent the loadings (or weights) of X and Y, respectively, and E and F are the residuals (or independent error terms).

This allows for an estimation of X and Y from their respective scores and loadings. Notably, the decomposition is performed in a way to maximize co-variance between T and U scores. This means that the score values of X are powerful for modeling Y-variables. Hence, the PLS- R method does not directly estimate Y from X but instead estimates U from T (see figure 3 for a graphical depiction of this technique). As Martens, 2001 calls it, PLS-R models Y from the *essence* of X.



Figure 3: Depiction of the indirect modeling technique of PLS-R, based on Tobias, 1999

Since this study attempts to verify the formulated hypotheses by examining the regression coefficients, it is crucial to compute confidence intervals and test for statistical significance. As Aâkouk, 2006 elaborates, a few approaches to achieve this have been presented in the literature already. It was considered that the method of Martens, 2001 will be used for the purpose of this research, as it is theoretically grounded as well as intuitively understandable and has already proven its applicability in a variety of empirical studies (e.g. Nokels et al., 2010; Aâkouk, 2006).

As Martens, 2001 point out, the PLS-R parameters are almost normally distributed. This allows for the computation of the standard deviations for each regression coefficient \hat{b}_k , by deriving the parameter

variations with the established *jack-knifing* cross validation technique. They propose that the 95% confidence interval of \hat{b}_k can be described as

$$\hat{b}_k \pm 2\hat{s}(\hat{b}_k) \tag{3.7}$$

where $\hat{s}(\hat{b})$ is the estimated standard uncertainty. Consequently, if the above confidence interval does not contain the value $b_k = 0$, the risk of falling for type I error (being fooled into detecting an effect that is not actually present) is as low as 5%. Putting it differently, if the confidence interval does not cross the zero line, the regression coefficient can be considered significant at the .05 level.

4. Results

This chapter outlines the results that have been obtained by conducting the proposed, quantitative questionnaire survey. Staring with a discussion of response rates and external validity issues, it proceeds with a description of model correlations and reliability measures. Eventually, the PLS regression results are presented, compared to the respective OLS estimates and tested for possible moderation effects. The calculations have been performed using *SPSS* (for the model correlations, cronbach's α and OLS regression) and *XLSTAT* (for the PLS regression).

4.1 Response rate and external validity

As table 2 indicates, 89 firms at least partially completed the questionnaire, which equals to 10.29% of the addressed sample. Deducting those, which were not reachable due invalid email addresses, a net response rate of 10.80% was achieved.

Given the applied method of email-based survey and the fact that only high level executive managers were addressed, the obtained net response rate seems sufficient. Schlüter, 2009 and Sill, 2008 who applied a similar technique, report response rates of 7.9% and 14.0%, re-

Response category	Number of recipients	Percantage of recipients
Answered completely	80	9.25%
Answered partially	9	1.04%
Not reachable (e-mail	41	4.74%
returned to sender)		
Invitations sent out	865	100.00 %

 Table 2: Response rates

Firm characteristics	Respondents		Sampling Frame		Population*	
Size class (# employees)						
≤ 9 employees	21	23.60%	230	26.49%	3290579	90.99%
$10 \le 49$ employees	49	55.06%	486	56.18%	268263	7.42%
$50 \le 250$ employees	19	21.35%	149	17.23%	57712	1.60%

*As of 2013, obtained by the Federal Statistical	Office of Germany (Statistisches Bun	desamt)
Table 3: Distribution of firm characteristics		

spectively. Also, one has to take into account that an unknown amount of invitations were not delivered due to SPAM filters or other technical constraints. In addition, Porter et al., 2004 found that nowadays the growing amount of surveys conducted in research causes *survey fa-tigue*. That is, the overexposure to surveys suppresses the participants' willingness to answer yet another one, which may be particularly true for student surveys.

A low response rate poses a threat for the external validity of the study. Since some subgroups may be highly overrepresented within the sample, one may not be able to reasonably generalize the findings on the entire population of interest. To investigate the potential bias, it is reasonable to consider supplementary information on the recipients.

As table 3 indicates, the group of respondents is significantly biased by the selection of the sample and, to a much lower extent, by non-response. While the latter is rather negligible, the differences between the population census and the sampling frame seem alarmingly great. On second thought, however, the severe underrepresentation of micro firms (≤ 9 employees) in the sample is an expectable result of referring to database information. Since these firms are not required to regularly report and disclose financial and administrative data, information on very small businesses is more difficult to obtain. Services, which commercially market company data, such as in the Hoppenstedt case, therefore have to rely on voluntarily participation to a greater extend. Building on a pre-existent database, although still the best available alternative, generates a sample that is substantially biased concerning the firm size.

An intuitive reaction to this challenge is to apply the technique of calibration weighting. As Bethlehem, 2010 explains, weighting comprises a family of techniques that support the accuracy of survey estimates by referring to auxiliary information. Since the distribution of some auxiliary variables is known in both, the group of respondents and the population, the researcher is able to assess the representativeness of the sample with regard to these variables. In this case, amount of employees, turnover per year and industry affiliation are known for each firm in the sample. The comparison of the distribution of those variables to census data from the national statistical office allows for a mathematical correction of the bias in regression models. That is, a specific weight is computed and assigned to each data set that accounts for its under-or over-representativeness.

However, weighting is only advised for slight corrections and should not be used to compensate for severe differences, as it would artificially inflate the error terms and thereby render the interactions insignificant (Winship and Radbill, 1994). This is particularly problematic in cases of small sample sizes. An initial attempt to apply weighting to the given data confirmed that the offset is too substantial to be corrected this way.

Hence, it is not reasonable to generalize on the entire population given the present sample bias. Instead of jointly analyzing all three size classes, the only possibility to obtain externally valid results, is to perform separate regression analysis for each group. As the amount of respondents for micro and medium sized firms is relatively small, one has to take into consideration that the regression coefficients will potentially seem not significant even though they constitute substantial influence factors. However, as mentioned earlier, the PLS regression technique is particularly suited to handle small samples (Farahani et al., 2010). Also, the separate analysis of the three size classes allows to uncover any moderating influences firm size may have on the hypothesized relationships.

4.2 Model Correlations and Regression Results

Table 4 depicts the correlations of the model variables. Concerning the environmental turbulence factors, the results confirm earlier work (e.g. Pelham, 1999; Menguc and Auh, 2006; Vorhies et al., 2009) with regard to the strong and highly significant relationship between the market turbulence and the technological turbulence constructs. Notably, Strategic Sensitivity is correlated with most independent variables, creating a major source for multicollinearity.

The reliability of the reflective constructs was examined by referring to cronbach's α , using the commonly accepted .7 cutoff criterion. As in the case of the Market Turbulence construct α did not directly fell within this limit, one of the former five items had to be deleted in order to fulfill the criterion. Unlike the independent variables, Business Model Innovativeness is represented by a formative instead of a reflective construct. Therefore, one cannot reasonably assess the intercorrelations between its items.

Measure	mean	sd	α			COI	relation	S		
				1.	2.	3.	4.	5.	6.	7.
1. SS	3.723	.886	.725							
2. CC	4.300	.748	.760	.518**	*					
3. RF	3.577	1.002	.864	.307**	.337*	*				
4. MT	2.972	.847	.747	.276**	.070	$.252^{*}$				
5. CI	3.195	.762	.763	.095	.030	131	.331**			
6. TT	2.885	.903	.819	$.249^{*}$	109	.122	.562***	* .186		
7. RT	2.736	1.212	.934	.138	.004	113	.135	.126	.042	
8. BMI	1.493	.238	/	.379**	* .083	.278*	.312**	.035	.254*	.104

Notes: p < .05, p < .01, p < .001

 Table 4: Means, standard deviations, cronbach's alpha (post correction) and correlations of model variables

The Partial Least Squares Regression Analyses resulted three one dimensional models. The overall variance explained by the data (R^2) sums up to 0.214, 0.214 and 0.272 for micro, small and medium sized enterprises, respectively.

As displayed by figure 4, the assumed positive impact of Strategic Sensitivity on Business Model Innovativeness (H1) is fully confirmed by the obtained data, for each of the three size classes. Notably, Strategic Sensitivity has a less strong influence on the innovativeness of small firms' business models, compared to micro and medium sized firms. Regarding the impact of Collective Commitment (H2), the data does not support any influence on Business Model Innovativeness. As for the last component of Strategic Agility, the corresponding hypothesis (H3) is partially supported by the data. While Resource Fluidity is substantially important for



*: significant with respect to the 95% confidence interval

Figure 4: Summarized coefficients of the partial least squares regression analyses

the Business Model Innovativeness of small firms, the data does not support this relationship for micro and medium sized enterprises.

A similar pattern occurs for the Market Turbulence construct and its respective hypothesis (H4), which also is only partially supported. The hypothesized positive influence of Competitive Intensity on Business Model Innovativeness (H5) is not supported by the data for any size class. However, as the error term of the coefficient is relatively close to zero in the case of micro sized firms, one may suspect that the hypothesis might be supported at a higher sample size (detailed figures of the PLS regression results, including the error terms, are located in Appendix C).

Regarding the regression results related to Technological Turbulence, the corresponding hypothesis (H6) is partially supported. Interestingly, the effect of Technological Turbulence on Business Model Innovativeness gradually increases with growing firm size. While the co-efficient is negative and not significant in the case of micro firms, it is positive and strongly significant for medium sized firms. As this indicates that the size class may positively moderate the hypothesized relationship, an additional moderation analysis was performed, using the

Independent Variable	Pearson correlation with the DV	OLS regression parameter estimate	PLS regression parameter estimate	
Strategic Sensitivity	0.379***	0.356**	0.188***	
Collective Commitment	0.083	-0.166	0.041	
Resource Fluidity	0.278*	0.176	0.136*	
Market Turbulence	0.312**	0.159	0.153 **	
Competitive Intensity	0.035	-0.048	0.017	
Technological Turbulence	0.254*	0.041	0.127*	
Regulatory Turbulence	0.104	0.066	0.053	
Adjusted R^2		0.164	0.198	

Notes: *p < .05, **p < .01, ***p < .001

 Table 5: Significance patterns of the OLS and PLS regression results (across size classes)

PROCESS plugin to *SPSS*, developed by Hayes, 2013. As a side result, the analysis confirmed the presence of a significant interaction term. Finally, H7 is not supported by the present data for any size class.

To check for the presence of multicollinearity, calculating the *condition number* is the preferred methodology (Belsley et al., 2004). As a rule of thumb, Belsley et al., 2004 suggest that a result greater than 10 indicates moderate collinearity, while at 30 it is a serious concern. For the current data, condition numbers of 49.88, 27.04 and 41.28 were computed for micro, small and medium sized firms, respectively. Especially regarding the relatively small sample size, the high collinearity expressed by these values interferes with the interpretation of regression results. As the presence of collinearity tends to inflate the error terms of regression coefficients (Adnan et al., 2006), it may render substantial influence factors to seem not significant, when examined by ordinary least squares regression.

In order to demonstrate this phenomenon, and thereby to justify the choice of PLS-R, an ordinary least squares regression was performed in addition. Table 5 shows the varying significance patterns of both methods compared to the bivariate Pearson correlation of the respective independent variable with the dependent variable. As Graber et al., 2002 note, in the absence of multicollinearity, the significance patterns would be similar across all methods. In this case, however, only a single OLS parameter estimate (Strategic Sensitivity) appears to be statistically significant. These results strongly highlight the necessity for the application of multicollinearity

resistant techniques, such as PLS-R, in this case, as otherwise the researcher would have fallen for several type II errors (that is, failure to reject a null hypothesis).

5. Discussion and Conclusion

In order to discuss and comprehend the obtained empirical results, it is essential to recall the purpose of the present work. As stated in chapter 1, the fundamental objective pursued in this study, is the identification of the most influential drivers for business model transformation processes. The general relevance of this goal for both, researchers and practitioners is particularly highlighted by the lack of generalizable findings and therefore universally applicable advice for SMEs. The current study represents a small, yet imporant step, to address this challenge, as it differs from the majority of academic contributions in the field by attempting to find general instead of case-specific influence factors for business model changes.

Besides this, the study contributes to the academic literature by demonstrating the relevance of the established environmental turbulence scales for business model research. This way, it adds to the connection of business model research to other literature streams.

As the first part of the research questions asks for antecedents of business model transformation located in the business environment, four potential environmental driver have been identified by referring to the academic literature. Subsequently, the hypothesized relationships were validated using a regression analysis.

The study revealed that market turbulence significantly predicts business model transformations in small firms, while Technological Turbulence does so for small and medium sized enterprises. Given that the business model literature stream was initiated by the advent of the internet to a large extent, a strong position of Technological developments was to be expected. The missing support for the Technological Turbulence hypothesis in the case of micro firms as well as the detected moderation effect indicate that the smallest firms' business models are not (yet) substantially affected by Technological progress.

Competitive intensity, however, is not a substantial antecedent for business model changes, as far as this study's data is concerned. With regard to the case studies reviewed in chapter 2.4, the lack of such a generalizable, positive effect indicates the specific and rather exceptional character of cases reporting business model transformations as a consequence of increased competition. Furthermore, the missing impact of regulatory changes may be a reasonable result of limiting the sample to German SMEs. Even though regulations may differ among industries, this effect probably is too small to be recognized using the present sample size.

As far as the second part of the research question is concerned, the study attempted to disclose the most relevant internal firm capabilities, which companies must necessarily posses in order to transform their respective business models in time. Since the strategic agility construct supposedly represents the essential business model innovation capabilities, it was hypothesized that the degree to which a firm is strategically agile allows for a reasonable prediction of its business model innovativeness. More specifically, it was assumed that each of the three subconstructs, which compose the strategic agility concept positively relates to business model innovativeness.

As the analysis of the present data reveals, Strategic Sensitivity is of outstanding importance for firms of either size. Apparently, the ability to sense and forecast future market developments is an essential antecedent for business model transformations. Also, Resource Fluidity was identified to significantly predict business model changes in small sized enterprises. While the missing impact in the case of medium sized firms is unexpected and might be attributed to the small sample size, micro firms presumably posses so little assets that a fluid reconfiguration is feasible in any case. Furthermore, Collective Commitment does not significantly impact the degree of business model innovativeness. As many SMEs are lead by a single owner-manager, the data probably did not provide enough variance to reasonably predict business model changes.

To comprisingly answer the research question, this thesis revealed two environmental influence factors, namely Market Turbulence and Technological Turbulence, as well as two types of firm capabilities, namely, Strategic Sensitivity and Resource Fluidity, which are essential antecedents of business model transformations in SMEs for at least one size class of businesses.

Concerning the study's limitations, one source of weakness surely is the relatively small sample size and the method of sample selection. As demonstrated, the firms derived from the database did not adequately reflect the population. Also, as the study is limited to German SMEs, generalizations to other regions and markets that differ in regulatory or cultural aspects may not be possible. Since the applied quantitive approach is relatively uncommon in the field of business model research, the study could not possibly rely on well established measurement scales for the business model innovativeness construct. Even though the utilized questionnaire items represent the best available option known to the researcher, this method is not yet commonly accepted.

In addition, the reliability of the derived agility, turbulence and business model innovativeness values is restricted, as the measurement solely relies on self assessment of the respondents perceptions. Supplementarily consulting objective data to verify the subjective impressions would help to identify exaggerated or biased answers and therefore is encouraged for future studies. However, this would require a much greater data base, compared to the present work, as well as additional effort in analysing the current and past situation of every single participating firm.

Further research is encouraged to investigate the relationships among the independent variables, as well as to detect additional influence factors for the business model innovativeness construct. Also, research would benefit from further empirical studies, which examine the relevance of the business model innovation construct for the general public of firms, instead of focusing too narrowly on specific cases and industries. Appendices

A. Survey Items

Strategic Agility	by Clauß and Hock, 2015, building on Doz and Kosonen, 2010
Strategic Sensitivity	$\alpha = 0.725$
 We are very sensitive nologies etc.) and internologies etc.) and internologies etc.) We utilize different model of the equirements for stratements for strat	e for external changes (regarding customers, competitors, tech- egrate these into strategic planning of our company. echanisms to become aware of strategic developments early. ategic adaptations are communicated fast and comprehensively ion.
Collective Commitment	$\alpha = 0.760$
 Our top management Our management boa Strategic questions ar down in top-level 'win 	team is able to make bold and fast strategic decisions. rd collaborates for strategic decisions. re collectively solved by our management without being bogged nlose' politics.
Resource Fluidity	$\alpha = 0.864$
We are able to reallocOur people and their oOur organizational str	ate and utilize capital resources fluidly. competencies are highly mobile within our organization. ructure allows for flexible redeployment of our resources.
Environmental	by Jaworski and Kohli, 1990 (first three constructs),
Turbulence	newly created (last construct)
Market Turbulence	$\alpha = 0.747$
 In our kind of busines Our customers tend to We are witnessing de bought them before. 	es, customers' product preferences change quite a bit over time. I look for new products all the time. I look for our products and services from customers who never

- New customers tend to have product-related needs that are different from those of our existing customers.
- We cater to many of the same customers that we used to in the past.*

*Item deleted deleted to increase internal validity (α).

Competitive Intensity

• Competition in our industry is cutthroat.

- There are many "promotion wars" in our industry.
- Anything that one competitor can offer, others can match readily.
- Price competition is a hallmark of our industry.
- One hears of a new competitive move almost every day.
- Our competitors are relatively weak.

Technological Turbulence

- The technology in our industry is changing rapidly.
- Technological changes provide big opportunities in our industry.
- A large number of new product ideas have been made possible through technological developments.

Regulatory Turbulence

- The laws and regulations in our industry are changing rapidly.
- The regulatory situation in our industry is rather stable.

Business Model	by Waldner et al., 2015,
Innovativeness	building on the Community Innovation Survey

- During the three years 2013 to 2015, did your enterprise introduce: New or significantly improved goods (exclude the simple resale of new goods and changes of a solely aesthetic nature)?
- During the three years 2013 to 2015, did your enterprise introduce: New or significantly improved services?
- Were any of your product innovations (goods or services) during the three years 2013 to 2015 new to your market?
- Were any of your product innovations during the three years 2013 to 2015 a first in Germany, Europe or a world first?
- During the three years 2013 to 2015, did your enterprise introduce new or significantly improved methods of manufacturing or producing goods or services?
- During the three years 2013 to 2015, did your enterprise introduce new or significantly improved logistics, delivery or distribution methods for your inputs, goods or services?
- During the three years 2013 to 2015, did your enterprise introduce new or significantly improved supporting activities for your processes, such as maintenance systems or operations for purchasing, accounting, or computing?
- During the three years 2013 to 2015, did your enterprise introduce new business practices for organizing procedures (i.e. supply chain management, business reengineering,knowledge management, lean production, quality management, etc.)?
- During the three years 2013 to 2015, did your enterprise introduce new methods of organizing external relations with other firms or public institutions (i.e. first use of alliances, partnerships, outsourcing or sub-contracting, etc.)?

 $\alpha = 0.763$

 $\alpha = 0.819$

 $\alpha=0.934$

- During the three years 2013 to 2015, did your enterprise introduce new methods for product placement or sales channels (i.e. first time use of franchising or distribution licenses, direct selling, exclusive retailing, new concepts for product presentation, etc.)?
- During the three years 2013 to 2015, did your enterprise introduce new methods of pricing goods or services (i.e. first time use of variable pricing by demand, discount systems, etc.)?

B. List of NACE codes

- 10 Manufacture of food products
- 11 Manufacture of beverages
- 12 Manufacture of tobacco products
- 13 Manufacture of textiles
- 14 Manufacture of wearing apparel
- 15 Manufacture of leather and related products
- 16 Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
- 17 Manufacture of paper and paper products
- 18 Printing and reproduction of recorded media
- 19 Manufacture of coke and refined petroleum products
- 20 Manufacture of chemicals and chemical products
- 21 Manufacture of basic pharmaceutical products and pharmaceutical preparations
- 22 Manufacture of rubber and plastic products
- 23 Manufacture of other non-metallic mineral products
- 24 Manufacture of basic metals
- 25 Manufacture of fabricated metal products, except machinery and equipment
- 26 Manufacture of computer, electronic and optical products
- 27 Manufacture of electrical equipment
- 28 Manufacture of machinery and equipment n.e.c.
- 29 Manufacture of motor vehicles, trailers and semi-trailers
- 30 Manufacture of other transport equipment
- 31 Manufacture of furniture
- 32 Other manufacturing
- 33 Repair and installation of machinery and equipment

- 36 Water collection, treatment and supply
- 37 Sewerage
- 38 Waste collection, treatment and disposal activities; materials recovery
- 39 Remediation activities and other waste management services
- 46 Wholesale trade
- 49 Land transport and transport via pipelines
- 50 Water transport
- 51 Air transport
- 52 Warehousing and support activities for transportation
- 53 Postal and courier activities
- 58 Publishing activities
- 59 Motion picture, video and television programme production, sound recording and music publishing activities
- 60 Programming and broadcasting activities
- 61 Telecommunications
- 62 Computer programming, consultancy and related activities
- 63 Information service activities
- 64 Financial service activities, except insurance and pension funding
- 65 Insurance, reinsurance and pension funding, except compulsory social security
- 66 Activities auxiliary to financial services and insurance activities
- 69 Legal and accounting activities
- 70 Activities of head offices; management consultancy activities
- 71 Architectural and engineering activities; technical testing and analysis
- 72 Scientific research and development
- 73 Advertising and market research
- 74 Other professional, scientific and technical activities
- 78 Employment activities
- 79 Travel agency, tour operator and other reservation service and related activities
- 80 Security and investigation activities
- 81 Services to buildings and landscape activities
- 82 Office administrative, office support and other business support activities

C. Detailed PLS-Regression Results





Small



■Medium

Bibliography

- Aâkouk, Mostafa (2006). "Market-based capabilities, perceived quality and firm performance". PhD thesis. Rijksuniversiteit Groningen.
- Abdi, Hervé (2010). "Partial least squares regression and projection on latent structure regression (PLS Regression)". In: Wiley Interdisciplinary Reviews: Computational Statistics 2.1, pp. 97–106.
- Adnan, Norliza, Maizah Hura Ahmad, and Robiah Adnan (2006). "A Comparative Study On Some Methods for Handling Multicollinearity Problems". In: *Matematika* 22.2, pp. 109–119.
- Afuah, Allan (2001). "Dynamic Boundaries of the Firm: Are Firms Better off Being Vertically Integrated in the Face of a Technological Change?" In: *The Academy of Management Journal* 44.6.
- Ahokanagas, Petri and Jenni Myllykoski (2014). "The Practice of Creating and Transforming a Business Model". In: *Journal of Business Models* 2.1, pp. 6–18.
- Aldrich, Howard E. and Jeffrey Pfeffer (1976). "Environments of Organizations". In: *Annual Review of Sociology* 2, pp. 79–105.
- Amit, Raphael and Christoph Zott (2001). "Value creation in E-business". In: *Strategic Management Journal* 22.6-7, pp. 493–520.
- Antonioli, Davide and Edoardo Della Torre (2016). "Innovation adoption and training activities in SMEs". In: *The International Journal of Human Resource Management* 27.3, pp. 311–337.
- Auh, Seigyoung and Bulent Menguc (2005). "Balancing exploration and exploitation: The moderating role of competitive intensity". In: *Journal of Business Research* 58.12, pp. 1652– 1661.
- Ayub, Arslan et al. (2014). "Entrepreneurial Call for Strategic Agility in Fast-Paced Business Environment". In: *Acta Universitatis Danubius* 10.3, pp. 146–154.
- Ayyagari, Meghana, Thorsten Beck, and Asli Demirgüç-Kunt (2003). "Small and Medium Enterprises across the Globe: A New Database". In: *World Bank Working Paper* 3127.
- Baden-Fuller, Charles and Stefan Haefliger (2013). "Business Models and Technological Innovation". In: *Long Range Planning* 46.6, pp. 419–426.
- Baden-Fuller, Charles and Mary S. Morgan (2010). "Business Models as Models". In: *Long Range Planning* 43.2-3, pp. 156–171.
- Barreto, Ilídio (2010). "Dynamic Capabilities: A Review of Past Research and an Agenda for the Future". In: *Journal of Management* 36.1, pp. 256–280.
- Bellmann, Richard et al. (1957). "On the Construction of a Multi-Stage, Multi-Person Business Game". In: *Operations Research* 5.469-503.
- Belsley, David A., Kuh Edwin, and Roy E. Welsch (2004). *Regression Diagnostics: Identifying Influential Data and Sources of Collinearity*. John Wiley.

- Bethlehem, Jelke (2010). "Selection Bias in Web Surveys". In: *International Statistical Review* 78.2, pp. 161–188.
- Bock, Adam J. and Gerard George (2014). "Agile Business Model Innovation". In: *European Business Review*.
- Bock, Adam J. et al. (2012). "The Effects of Culture and Structure on Strategic Flexibility during Business Model Innovation". In: *Journal of Management Studies* 49.2, pp. 279–305.
- Bohnsack, René, Jonatan Pinkse, and Ans Kolk (2014). "Business models for sustainable technologies: Exploring business model evolution in the case of electric vehicles". In: *Research Policy* 43.2, pp. 284–300.
- Bowyer, Dorothea and Ross L. Chapman (2014). "Does privatisation drive innovation? Business model innovation through stakeholder viewpoints: the case of Sydney Airport 10 years post-privatisation". In: *Journal of Management & Organization* 20.365-386.
- Brown, Ross, Colin Mason, and Suzanne Mawson (2014). "Increasing 'The Vital 6 Percent': Designing Effective Public Policy to Support High Growth Firms". In: *Nesta Working Paper Series* 14/01.
- Brown, Shona L. and Kathleen M. Eisenhardt (1998). *Competing on the Edge: Strategy as Structured Chaos*. Harvard Business School Press.
- Bryman, A. and E. Bell (2015). Business Research Methods. Oxford University Press.
- Burt, George et al. (2006). "The Role of Scenario Planning in Exploring the Environment in View of the Limitations of PEST and Its Derivatives". In: *International Studies of Management and Organization* 36.3, pp. 50–76.
- Cadogan, John W. et al. (2001). "Key antecedents to "export" market-oriented behaviors: A cross-national empirical examination". In: *International Journal of Research in Marketing* 18.3, pp. 261–282.
- Candi, Marina, Jan den van Ende, and Gerda Gemser (2013). "Organizing innovation projects under technological turbulence". In: *Technovation* 33.4-5, pp. 133–141.
- Carrascal, Luis M., Ismael Galván, and Oscar Gordo (2009). "Partial least squares regression as an alternative to current regression methods used in ecology". In: *Oikos* 118.5, pp. 681–690.
- Casadesus-Masanell, Ramon and Joan E. Ricart (2011). "How to Design A Winning Business Model". In: *Harvard Business Review*.
- Casadesus-Masanell, Ramon and Joan Enric Ricart (2010). "From Strategy to Business Models and onto Tactics". In: *Long Range Planning* 43.2-3, pp. 195–215.
- Casadesus-Masanell, Ramon and Feng Zhu (2013). "Business model innovation and competitive imitation: The case of sponsor-based business models". In: *Strategic Management Journal* 34.4, pp. 464–482.
- Chang, Yu-Ting et al. (2014). "Corporate Business Model Innovation: The Case of Travel Agent". In: 2014 Proceedings of PICMET '14: Infrastructure and Service Integration.
- Chen, Kaui-Hwang et al. (2016). "Service innovation and new product performance: The influence of market-linking capabilities and market turbulence". In: *International Journal of Production Economics* 54-64.
- Chesbrough, Henry (2007). "Business model innovation: it's not just about technology anymore". In: *Strategy & Leadership* 35.6, pp. 12–17.
- (2010). "Business Model Innovation: Opportunities and Barriers". In: *Long Range Planning* 43.2-3, pp. 354–363.

- Chesbrough, Henry and Richard S. Rosenbloom (2002). "The role of the business model in capturing value from innovation: evidence from Xerox Corporation's technology spin-off companies". In: *Industrial and Corporate Change* 11.3, pp. 529–555.
- Chi, Ting and Yao Sun (2013). "Development of firm export market oriented behavior: Evidence from an emerging economy". In: *International Business Review* 22.1, pp. 339–350.
- Chiang, Chung-Yean, Canan Kocabasoglu-Hillmer, and Nallan Suresh (2012). "An empirical investigation of the impact of strategic sourcing and flexibility on firm's supply chain agility". In: *International Journal of Operations & Production Management* 32.1, pp. 49– 78.
- Clauß, Thomas (in press). "Measuring Business Model Innovation: Conceptualization, Scale Development and Proof of Performance". In: *R&D Management*.
- Clauß, Thomas and Marianne Hock (2015). "The Impact of Organizational Culture on a Firm's Capability to innovate the Business Model". In: *R&D Management* yet unpublished.
- Cucculelli, Marco and Cristina Bettinelli (2015). "Business models, intangibles and firm performance: Evidence on corporate entrepreneurship from Italian manufacturing SMEs". In: *Small Business Economics* 45.2, pp. 329–350.
- DaSilva, Carlos M. and Peter Trkman (2014). "Business Model: What It Is and What It Is Not". In: *Long Range Planning* 47.6, pp. 379–389.
- Decker, Carolin and Thomas Mellewigt (2012). "Business Exit and Strategic Change: Sticking to the Knitting or Striking a New Path?" In: *British Journal of Management* 23.2, pp. 165–178.
- Demil, Benoît and Xavier Lecocq (2010). "Business Model Evolution: In Search of Dynamic Consistency". In: *Long Range Planning* 43.2-3, pp. 227–246.
- DeVor, Richard, Robert Graves, and John J. Mills (1997). "Agile manufacturing research: Accomplishments and opportunities". In: *IIE Transactions* 29.10, pp. 813–823.
- Di Stefano, G., M. Peteraf, and G. Verona (2010). "Dynamic Capabilities Deconstructed: A Bibliographic Investigation into the Origins, Development, and Future Directions of the Research Domain". In: *Industrial and Corporate Change* 19.4, pp. 1187–1204.
- Dillman, Don A., Jolene D. Smyth, and Leah Melani Christian (2007). *Mail and Internet Surveys: The Tailored Design Method*. Wiley.
- Ding, Hao, Bingcheng Wang, and Fang Yang (2013). "Study on the Construct of Business Model Innovation". In: *International Academic Workshop on Social Science (IAW-2013)*.
- Doganova, Liliana and Marie Eyquem-Renault (2009). "What do business models do? Innovation devices in technology entrepreneurship". In: *Research Policy* 38.10, pp. 1559–1570.
- Doz, Yves L. and Mikko Kosonen (2008). "The Dynamics of Strategic Agility: Nokia's Rollercoaster Experience". In: *California Management Review* 50.3.
- (2010). "Embedding Strategic Agility: A Leadership Agenda for Accelerating Business Model Renewal". In: *Long Range Planning* 43.2-3, pp. 370–382.
- Dwyer, F. Robert and M. Ann Welsh (1985). "Environmental Relationships of the Internal Political Economy of Marketing Channels". In: *Journal of Marketing Research* 22.4, p. 397.
- Eckhardt, J. T. (2013). "Opportunities in business model research". In: *Strategic Organization* 11.4, pp. 412–417.
- Edwards, Tony et al. (2007). "Charting the Contours of Multinationals in Britain: Methodological challenges arising in survey-based research". In: *Warwick Papers in Industrial Relations* 86.

- Eisenhardt, Kathleen M. and Jeffrey A. Martin (2000). "Dynamic Capabilities: What are they?" In: *Strategic Management Journal* 21.10/11, pp. 1105–1121.
- Enkel, Ellen and Florian Mezger (2013). "Imitation Processes and their Application for Business Model Innovation: An Explorative Study". In: *International Journal of Innovation Management* 17.1.
- Euchner, Jim and Abhijit Ganguly (2014). "Business Model Innovation Practice: A systematic approach to business model innovation can help capture value and reduce risks". In: *Research-Technology Management*.
- European Commission (2005). "The new SME definition: User guide and model declaration". In: *Enterprose and Industry Publications*.
- (2014). Horizon 2020 dedicated SME Instrument Phase 1 and 2, 2014-2015.
- Eurostat (2015). "9 out of 10 enterprises in the EU employed fewer than 10 persons: More than 1.6 million new sole-entrepreneurs in 2012". PhD thesis. Eurostat Newsrelease.
- Farahani, Hojjat A. et al. (2010). "A Comparison of Partial Least Squares (PLS) and Ordinary Least Squares (OLS) regressions in predicting of couples mental health based on their communicational patterns". In: *Procedia - Social and Behavioral Sciences* 5, pp. 1459–1463.
- Fayezi, Sajad, Ambika Zutshi, and Andrew O'Loughlin (2014). "How Australian manufacturing firms perceive and understand the concepts of agility and flexibility in the supply chain". In: *International Journal of Operations & Production Management* 25.2.
- Fiet, James O. and Pankaj C. Patel (2008). "Forgiving Business Models for New Ventures". In: *Entrepreneurship Theory and Practice* 32.4, pp. 749–761.
- Fliedner, G. and R. Vokurka (1997). "Agility: the next competitive weapon". In: *APICS-The Performance Advantage Magazine* 7, pp. 56–59.
- Ganguly, Anirban, Roshanak Nilchiani, and John V. Farr (2009). "Evaluating agility in corporate enterprises". In: *International Journal of Production Economics* 118.2, pp. 410–423.
- George, Gerard and Adam J. Bock (2011). "The Business Model in Practice and its Implications for Entrepreneurship Research". In: *Entrepreneurship Theory and Practice* 35.1, pp. 83–111.
- Ghaziani, Amin and Marc J. Ventresca (2005). "Keywords and Cultural Change: Frame Analysis of Business Model Public Talk, 1975–2000". In: *Sociological Forum* 20.14, pp. 523– 559.
- Ghezzi, Antonio et al. (2015). "On business models, resources and exogenous (dis)continuous innovation: evidences from the mobile applications industry". In: *International Journal of Technology Management* 68.1.
- Giesen, Edward et al. (2007). "Three ways to successfully innovate your business model". In: *Strategy & Leadership* 35.6, pp. 27–33.
- Gladwin, Thomas N., James J. Kennelly, and Tara-Shelomith Krause (1995). "Shifting Paradigms for Sustainable Development: Implications for Management Theory and Research". In: *The Academy of Management Review* 20.4, pp. 874–907.
- Gnatzy, Tobias and Roger Moser (2012). "Scenario development for an evolving health insurance industry in rural India: INPUT for business model innovation". In: *Technological Forecasting and Social Change* 79.4, pp. 688–699.
- Graber, Stéphane, Sandor Czellar, and Jean-Emile Denis (2002). "Using Partial Least Squares Regression in Marketing Research". In: *Working Paper at University of Geneva*.
- Greenley, Gordon E. (1995). "Forms of Market Orientation in UK companies". In: *Journal of Management Studies* 32.1, pp. 47–66.

- Grewal, Rajdeep and Patriya Tansuhaj (2001). "Building Organizational Capabilities for Managing Economic Crisis: The Role of Market Orientation and Strategic Flexibility". In: *Journal of Marketing* 65, pp. 67–80.
- Gsodam, Petra, Romana Rauter, and Rupert J. Baumgartner (2015). "The renewable energy debate: How Austrian electric utilities are changing their business models". In: *Energy, Sustainability and Society* 5.1, p. 724.
- Gunasekaran, A. (1998). "Agile manufacturing: Enablers and an implementation framework". In: *International Journal of Production Research* 36.5, pp. 1223–1247.
- Günzel, Franziska and Anna B. Holm (2013). "One Size does not fit all Understanding the Front-End and Back-End of Business Model Innovation". In: *International Journal of Innovation Management* 17.01, p. 1340002.
- Halecker, Bastian, Katharina Hölzle, and Michel Sittner (2014). "Business Development and Business Model Innovation: Status Quo and Future Developments". Result Report on the Study. University of Potsdam.
- Hambrick, Donald C. (1982). "Environmental Scanning and Organizational Strategy". In: *Strategic Management Journal* 3.2, pp. 159–174.
- Hamel, Gary and Bill Breen (2007). *The Future of Management*. Harvard Business School Press.
- Hayes, Andrew F. (2013). Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach. The Guilford Press.
- Heerwegh, Dirk (2005). "Effects of Personal Salutations in E-Mail Invitations to Participate in a Web Survey". In: *Public Opinion Quarterly* 69.4, pp. 588–598.
- Heikkilä, Marikka and Jukka Heikkilä (2013). Collaborative Business Model Innovation Process for Networked Services. Co-created Effective, Agile, and Trusted eServices. Springer.
- Holm, Anna B., Franziska Günzel, and John Ulhøi (2013). "Openness in innovation and business models: Lessons from the newspaper industry". In: *International Journal of Technology Management* 61.3/4.
- Huang, Hao-Chen et al. (2012). "Target Costing, Business Model Innovation, and Firm Performance: An Empirical Analysis of Chinese Firms". In: *Canadian Journal of Administrative Sciences / Revue Canadienne des Sciences de l'Administration* 29.4, pp. 322–335.
- Huang, Hao-Chen et al. (2014). "A team-learning framework for business model innovation in an emerging market". In: *Journal of Management & Organization* 20.1, pp. 100–120.
- Hudson, Mel, Andi Smart, and Mike Bourne (2001). "Theory and practice in SME performance measurement systems". In: *International Journal of Operations & Production Management* 21.8, pp. 1096–1115.
- Hult, G.Tomas M., Robert F. Hurley, and Gary A. Knight (2004). "Innovativeness: Its antecedents and impact on business performance". In: *Industrial Marketing Management* 33.5, pp. 429–438.
- Idris, Wael Mohamad Subhi and Methaq Taher Kadhim Al-Rubaie (2013). "Examining the Impact of Strategic Learning on Strategic Agility". In: *Journal of Management and Strategy* 4.2.
- Jaworski, Bernard J. and Ajay K. Kohli (1990). "Market Orientation: The Construct, Research Propositions, and Managerial Implications". In: *Journal of Marketing* 54, pp. 1–18.
- (1993). "Market Orientation: Antecedents and consequences". In: *Journal of Marketing* 57, pp. 53–70.

- Jones, Gardner M. (1960). "Educators, Electrons, and Business Models: A Problem in Synthesis". In: *The Accounting Review* 35.4.
- Kamprath, Martin et al. (2014). ""How to Paint the Canvas?" The Business Model Environment Template". In: XXV ISPIM Conference – Innovation for Sustainable Economy & Society.
- Kesting, Peter and Franziska Günzel-Jensen (2015). "SMEs and new ventures need business model sophistication". In: *Business Horizons* 58.3, pp. 285–293.
- Khanagha, Saeed, Henk Volberda, and Ilan Oshri (2014). "Business model renewal and ambidexterity: structural alteration and strategy formation process during transition to a Cloud business model". In: *R&D Management* 44.3, pp. 322–340.
- Kidd, Paul T. (1994). Agile Manufacturing: Forging New Frontiers. Addison-Wesley.
- Kim, Stephen K. and Sungwook Min (2015). "Business Model Innovation Performance: When does Adding a New Business Model Benefit an Incumbent?" In: *Strategic Entrepreneurship Journal* 9.1, pp. 34–57.
- Klang, David, Maria Wallnöfer, and Fredrik Hacklin (2010). "The Anatomy of the Business Model: A syntactical Review and Research Agenda". In: *Driud Summer Conference 2010*.
- (2014). "The Business Model Paradox: A Systematic Review and Exploration of Antecedents". In: *International Journal of Management Reviews* 16.4, pp. 454–478.
- Knollmann, Ramon (2007). Kooperation von Controllerbereich und Strategieabteilung. 1st ed. Vol. 26. Schriften des Center for Controlling & Management (CCM). Wiesbaden: Gabler Verlag.
- Kollmann, Tobias (2006). *E-Entrepreneurshi: Grundlagen der Unternehmensgründung in der Net Economy*. 2nd ed. Wiesbaden: Gabler Verlag.
- Kollmann, Tobias and Christoph Stöckmann (2014). "Filling the Entrepreneurial Orientation-Performance Gap: The Mediating Effects of Exploratory and Exploitative Innovations". In: *Entrepreneurship Theory and Practice* 38.5, pp. 1001–1026.
- Kraus, Sascha et al. (2012). "Entrepreneurial orientation and the business performance of SMEs: a quantitative study from the Netherlands". In: *Review of Managerial Science* 6, pp. 161–182.
- Laitinen, Erkki K. (2006). "Partial Least Squares Regression in Payment Default Prediction". In: *Investment Management and Financial Innovations* 3.1.
- Lambert, Susan (2003). "Business Models: What are they good for". In:
- Lambert, Susan C. and Robyn A. Davidson (2013). "Applications of the business model in studies of enterprise success, innovation and classification: An analysis of empirical research from 1996 to 2010". In: *European Management Journal* 31.6, pp. 668–681.
- Leih, Sohvi, Greg Linden, and David J. Teece (2015). "Business Model Innovation and Organizational Design: A Dynamic Capabilities Perspective". In: *Business Model Innovation: The Organizational Dimension*. Ed. by Nicolai Foss and Tina Saebi. Oxford University Press.
- Lewis, Marianne W. (2000). "Exploring Paradox: Toward a More Comprehensive Guide". In: *The Academy of Management Review* 25.4, pp. 760–776.
- Lewis, Marianne W., Constantine Andriopoulos, and Wendy K. Smith (2014). "Paradoxical Leadership to Enable Strategic Agility". In: *California Management Review* 56.3, pp. 58– 77.
- Lindgren, Peter (2012). "Business Model Innovation Leadership: How Do SME's Strategically Lead Business Model Innovation?" In: *International Journal of Business and Management* 7.14, pp. 53–66.

- Lubatkin, M. H. (2006). "Ambidexterity and Performance in Small-to Medium-Sized Firms: The Pivotal Role of Top Management Team Behavioral Integration". In: *Journal of Management* 32.5, pp. 646–672.
- Lv, Xiaoping and Xiaoli Liu (2012). "Research on Business Model Innovation of the Traditional Large-scale Retail Enterprises' Transition to the E-commerce". In:
- Mahapatra, Santosh K., Ajay Das, and Ram Narasimhan (2012). "A contingent theory of supplier management initiatives: Effects of competitive intensity and product life cycle". In: *Journal of Operations Management* 30.5, pp. 406–422.
- Markides, Constantinos (2006). "Disruptive Innovation: In Need of Better Theory". In: *Journal* of Product Innovation Management 23, pp. 19–25.
- Martens, Harald (2001). "Reliable and relevant modelling of real world data: a personal account of the development of PLS Regression". In: *Chemometrics and Intelligent Laboratory Systems* 58, pp. 85–95.
- Martens, Harald and Magni Martens (2000). "Modified Jack-knife estimation of parameter uncertainty in bilinear modelling by partial least squares regression (PLSR)". In: *Food Quality and Preference* 11.1-2, pp. 5–16.
- Martins, Luis L., Violina P. Rindova, and Bruce E. Greenbaum (2015). "Unlocking the Hidden Value of Concepts: A Cognitive Approach to Business Model Innovation". In: *Strategic Entrepreneurship Journal* 9.1, pp. 99–117.
- McGrath, Rita Gunther (2010). "Business Models: A Discovery Driven Approach". In: *Long Range Planning* 43.2-3, pp. 247–261.
- Menguc, Bulent and Seigyoung Auh (2006). "Creating a Firm-Level Dynamic Capability through Capitalizing on Market Orientation and Innovativeness". In: *Journal of the Academy of Marketing Science* 34.1, pp. 63–73.
- Meredith, Sandra and David Francis (2000). "Journey towards agility: The agile wheel explored". In: *The TQM Magazine* 12.2, pp. 137–143.
- Michaelidou, Nina and Sally Dibb (2006). "Using email questionnaires for resaerch: Good practice in tackling non-response". In: *Journal of Targeting, Measurement and Analysis for Marketing* 14.4.
- Miller, Danny (1996). "Configurations Revisited". In: *Strategic Management Journal* 17.7, pp. 505–512.
- Morgan, Robert E. and Kelly Page (2008). "Managing business transformation to deliver strategic agility". In: *Strategic Change* 17.5-6, pp. 155–168.
- Morris, Michael, Minet Schindehutte, and Jeffrey Allen (2005). "The entrepreneur's business model: toward a unified perspective". In: *Journal of Business Research* 58.6, pp. 726–735.
- Nielsen, Christian, Colin Haslam, and Romeo V. Turcan (2013). "We give you the Journal of Business Models (for free): The inaugural editorial". In: *Journal of Business Models* 1.1, pp. 3–12.
- Nizar, Abdelkafi, Sergiy Makhotin, and Thorsten Posselt (2013). "Business Model Innovations for Electric Mobility What can be learned from existing Business Model Patterns?" In: *International Journal of Innovation Management* 17.01.
- Nokels, Laure, Thierry Fahmy, and Sébastian Chrochemore (2010). "Interpretation of the Preferences of Automotive Customers Applied to Air Conditioning Supports by Combining GPA and PLS Regression". In: *Handbook of Partial Least Squares: Concepts, Methods and Applications*. Ed. by Vincenzo Esposito Vinzi et al. Berlin: Springer, pp. 775–788.

- Ofoegbu, Onyema E. and Paul Ayobami Ankabi (2012). "The Influence Of Strategic Agility On The Perceived Performance Of Manufacturing Firms In Nigeria". In: *International Business* & *Economics Research Journal* 11.2.
- Osterwalder, Alexander (2004). "The Business Model Ontology: A Proposition in a Design Science Approach". Doctoral Thesis. Université de Lausanne.
- Osterwalder, Alexander, Yves Pigneur, and Christopher L. Tucci (2005). "Clarifying Business Models: Origins, Present, and Future of the concept". In: *Communications of the Association for Information Systems* 15.
- Overby, Eric, Anandhi Bharadwaj, and V. Sambamurthy (2006). "Enterprise agility and the enabling role of information technology". In: *European Journal of Information Systems* 15.2, pp. 120–131.
- Oyedijo, Ade (2012). "Strategic Agility and Competitive Performance in the Nigerian Telecommunication Industry: An Empirical Investigation". In: *American International Journal of Contemporary Research* 2.3.
- Pelham, Alfred M. (1999). "Influence of Environment, Strategy, and Market Orientation on Performance in Small Manufacturing Firms". In: *Journal of Business Research* 45.1, pp. 33– 46.
- Pohle, George and Marc Chapman (2006). "IBM's global CEO report 2006: business model innovation matters". In: *Strategy & Leadership* 34.5, pp. 34–40.
- Porter, Michael E. (1980). *Competitive Strategy. Techniques for Analyzing Industries and Competitors*. New York: Free Press.
- (2001). "Strategy and the Internet". In: Harvard Business Review.
- (2008). "The Five Competitive Forces that Shape Strategy". In: *Harvard Business Review*, pp. 78–93.
- Porter, Stephen R., Michael E. Whitcomb, and William H. Weitzer (2004). "Multiple surveys of students and survey fatigue". In: *New Directions for Institutional Research* 2004.121, pp. 63–73.
- Rahman, Shams-ur (2001). "A comparative study of TQM practice and organisational performance of SMEs with and without ISO 9000 certification". In: *International Journal of Quality & Reliability Management* 18.1, pp. 35–49.
- Reuver, Mark de, Harry Bouwman, and Ian Macinnes (2009). "Business model dynamics: A case survey". In: *Journal of theoretical and applied electronic commerce research* 4.1.
- Richter, Mario (2013). "Business model innovation for sustainable energy: German utilities and renewable energy". In: *Energy Policy* 62, pp. 1226–1237.
- Rindova, Violina P. and Suresh Kotha (2001). "Continuous Morphing: Competing through Dynamic Capabilities, Form, and Function". In: *The Academy of Management Journal* 44.6, pp. 1263–1280.
- Rogers, Mark (2004). "Networks, Firm Size and Innovation". In: *Small Business Economics* 22.2, pp. 141–153.
- Rothwell, Roy and E.M Dodgson (1994). *Innovation and Size of Firm*. The Handbook of Industrial Innovation.
- Santos-Vijandea, María Leticia and Luis Ignacio Álvarez-González (2007). "Innovativeness and organizational innovation in total quality oriented firms: The moderating role of market turbulence". In: *Technovation* 27, pp. 514–532.
- Saunders, Mark, Philip Lewis, and Adrian Thornhill (2009). *Research methods for business students*. 5th ed. Pearson Education.
- Schallmo, Daniel R. A. and Leo Brecht (2010). "Business Model Innovation in Business-to-Business Markets - Procedure and Examples". In: *3rd ISPIM Innovation Symposium: Managing the Art of Innovation: Turning Concepts into Reality.*
- (2011). "An Innovative Business Model: The Sustainability Provider". In: XXII ISPIM Conference: Sustainability in Innovation: Innovation Management Challenges.
- Schlüter, Hendrik (2009). Interne Beratung durch den Controllerbereich: Messung Wirkung -Determinanten. 1st ed. Vol. 36. Schriften des Center for Controlling & Management (CCM).
 Wiesbaden: Gabler Verlag.
- Schneckenberg, Dirk et al. (2016). "Business model innovation and decision making: uncovering mechanisms for coping with uncertainty". In: *R&D Management*.
- Schneider, Sabrina and Patrick Spieth (2013). "Business Model Innovation: Towards an Integrated Future Research Agenda". In: *International Journal of Innovation Management* 17.1, p. 1340001.
- Shafer, Scott M., H. Jeff Smith, and Jane C. Linder (2005). "The power of business models". In: *Business Horizons* 48.3, pp. 199–207.
- Sharifi, H. and Z. Zhang (1999). "A methodology for achieving agility in manufacturing organisations: An introduction". In: *International Journal of Production Economics* 62, pp. 7– 22.
- Shin, Hojung et al. (2015). "Strategic agility of Korean small and medium enterprises and its influence on operational and firm performance". In: *International Journal of Production Economics* 168, pp. 181–196.
- Sill, Frauke (2008). *Controllerbereichserfolg aus Sicht des Managements: Eine empirische Analyse*. 1st ed. Vol. 33. Schriften des Center for Controlling & Management (CCM). Wiesbaden: Gabler Verlag.
- Singh, Rajesh K., Suresh K. Garg, and S.G Deshmukh (2008). "Strategy development by SMEs for competitiveness: a review". In: *Benchmarking: An International Journal* 15.5, pp. 525– 547.
- Sivertsson, Olof and Joakim Tell (2015). "Barriers to Business Model Innovation in Swedish Agriculture". In: *Sustainability* 7.2, pp. 1957–1969.
- Slater, Stanley F. and John C. Narver (1994). "Does Competitive Environment Moderate the Market Orientation-Performance Relationship?" In: *Journal of Marketing* 58.1, p. 46.
- Sosna, Marc, Rosa Nelly Trevinyo-Rodríguez, and S. Ramakrishna Velamuri (2010). "Business Model Innovation through Trial-and-Error Learning: The Naturehouse Case". In: *Long Range Planning* 43.2-3, pp. 383–407.
- Subramanian, Ram and Pradeep Gopalakrishna (2001). "The market orientation±performance relationship in the context of a developing economy: An empirical analysis". In: *Journal of Business Research* 53, pp. 1–13.
- Swoboda, Bernhard and Edith Olejnik (2016). "Linking Processes and Dynamic Capabilities of International SMEs: The Mediating Effect of International Entrepreneurial Orientation". In: *Journal of Small Business Management* 54.1, pp. 139–161.
- Tallon, Paul and Albain Pinsonneault (2011). "Competing Perspectives on the Link Between Strategic Information Technology Alignment and Organizational Agility: Insights From a Mediation Model". In: *MIS Quarterly* 35.2.
- Taran, Yariv (2011). "Rethinking it all: Overcoming Obstacles to Business Model Innovation". Ph.D. Dissertation. Aalborg: Aalborg University.

- Taran, Yariv, Harry Boer, and Peter Lindgren (2015). "A Business Model Innovation Typology". In: *Decision Sciences* 46.2, pp. 301–331.
- Tavani, Saeed Najafi, Hossein Sharifi, and Hossam S. Ismail (2013). "A study of contingency relationships between supplier involvement, absorptive capacity and agile product innovation". In: *International Journal of Operations & Production Management* 34.1, pp. 65–92.
- Teece, David J. (2007). "Explicating dynamic capabilities: The nature and Microfoundations of (sustainable) Enterprise Performance". In: *Strategic Management Journal* 28.13, pp. 1319– 1350.
- (2010). "Business Models, Business Strategy and Innovation". In: Long Range Planning 43.2-3, pp. 172–194.
- Teece, David J., Gary Pisano, and Amy Shuen (1997). "Dynamic Capabilities and Strategic Management". In: *Strategic Management Journal* 18.7.
- Timmers, Paul (1998). "Business Models for Electronic Markets". In: *Electronic Markets* 8.2, pp. 3–8.
- Tobias, Randall D. (1999). An Introduction to Partial Least Squares Regression.
- Trimi, Silvana and Jasmina Berbegal-Mirabent (2012). "Business model innovation in entrepreneurship". In: *International Entrepreneurship and Management Journal* 8.4, pp. 449–465.
- Umbeck, Tobias (2009). *Musterbrüche in Geschäftsmodellen: Ein Bezugsrahmen für innovative Strategie-Konzepte*. Wiesbaden: Gabler Verlag.
- van Hoek, Remko I., Alan Harrison, and Martin Christopher (2001). "Measuring agile capabilities in the supply chain". In: *International Journal of Operations & Production Management* 21.1/2, pp. 126–148.
- Velu, Chander (2015). "Business Model Innovation and Third-Party Alliance on the Survival of New Firms". In: *Technovation* 25, pp. 1–11.
- Verhees, Frans J. H. M. and Metthew T. G. Meulenberg (2004). "Market Orientation, Innovativeness, Product Innovation, and Performance in Small Firms". In: *Journal of Small Business Management* 42.2, pp. 134–154.
- Vinzi, Vincenzo Esposito et al., eds. (2010). Handbook of Partial Least Squares: Concepts, Methods and Applications. Berlin: Springer.
- Voelpel, Sven C., Marius Leibold, and Eden B. Tekie (2004). "The wheel of business model reinvention: How to reshape your business model to leapfrog competitors". In: *Journal of Change Management* 4.3, pp. 259–276.
- Vorhies, Douglas W., Robert E. Morgan, and Chad W. Autry (2009). "Product-market strategy and the marketing capabilities of the firm: Impact on market effectiveness and cash flow performance". In: *Strategic Management Journal* 30.12, pp. 1310–1334.
- Waldner, Florian et al. (2015). "Antecedents and consequences of business model innovation: The role of industry structure". In: *Driud 15 Conference*.
- Wang, Zhu (2006). "Technological Innovation and Market Turbulence: The Dot-com Experience*". In: *Review of Economic Dynamics*.
- Weber, Yaakov and Shlomo Y. Tarba (2014). "Strategic Agility: A State of the Art: Introduction to the Special Section on Strategic Agility". In: *California Management Review* 56.3.
- Wei, Zelong et al. (2014). "The fit between technological innovation and business model design for firm growth: evidence from China". In: *R&D Management* 44.3, pp. 288–305.
- Wheelen, Thomas L. and J. David Hunger (1999). *Strategic Management and Business Policy*. Addison-Wesley.

- Wijen, Frank and Rob van Tulder (2011). "Integrating Environmental and International Strategies in a World of Regulatory Turbulence". In: *California Management Review* 53.4.
- Wilden, Ralf, Timothy M. Devinney, and Grahame R. Dowling (2016). "The Architecture of Dynamic Capability Research: Identifying the Building Blocks of a Configurational Approach". In:
- Winship, Christopher and Larry Radbill (1994). "Sampling Weights and Regression Analysis". In: *Sociological Methods & Research* 23.2, pp. 230–257.
- Winter, Sidney G. (2003). "Understanding Dynamic Capabilities". In: *Strategic Management Journal* 24.10, pp. 991–995.
- Wirtz, Bernd W., Oliver Schilke, and Sebastian Ullrich (2010). "Strategic Development of Business Models". In: *Long Range Planning* 43.2-3, pp. 272–290.
- Wold, Herman (1975). "Soft modelling by latent variables; the nonlinear iterative partial least squares approach". In: *Perspectives in probability and statistics. Papers in honour of M. S. Barlett*, pp. 117–142.
- Wynarczyk, P., P. Piperopoulos, and M. McAdam (2013). "Open innovation in small and mediumsized enterprises: An overview". In: *International Small Business Journal* 31.3, pp. 240– 255.
- Zahra, Shaker A. (1993). "Environment, Corporate Entrepreneurship, and Financial Performance: A Taxonomic Approach". In: *Journal of Business Venturing* 8, pp. 319–340.
- Zahra, Shaker A., Harry J. Sapienza, and Per Davidsson (2006). "Entrepreneurship and Dynamic Capabilities: A Review, Model and Research Agenda". In: *Journal of Management Studies* 43.4, pp. 917–955.
- Zheng, Wen-jun and Hong-li Wang (2011). "Organizational Performance Evaluation of Power Supply with Partial Least Squares Regression". In: *Proceedings 2011 IEEE 18th International Conference on Industrial Engineering and Engineering Management*.
- Zolnowski, Andreas, Christian Weiß, and Tilo Bohmann (2014). "Representing Service Business Models with the Service Business Model Canvas The Case of a Mobile Payment Service in the Retail Industry". In: 2014 47th Hawaii International Conference on System Science.
- Zott, Christoph and Raphael Amit (2007). "Business Model Design and the Performance of Entrepreneurial Firms". In: *Organization Science* 18.2, pp. 181–199.
- (2008). "The fit between product market strategy and business model: Implications for firm performance". In: *Strategic Management Journal* 29.1, pp. 1–26.
- (2009). "Designing your Future Business Model: An Activity Systems Perspective". In: IESE Business School Working Paper WP-781.
- (2010). "Business Model Design: An Activity System Perspective". In: Long Range Planning 43.2-3, pp. 216–226.
- (2013). "The business model: A theoretically anchored robust construct for strategic analysis". In: *Strategic Organization* 11.4, pp. 403–411.
- Zott, Christoph, Raphael Amit, and Lorenzo Massa (2011). "The Business Model: Recent Developments and Future Research". In: *Journal of Management* 37.4, pp. 1019–1042.