

Karolin Frankenberger, Tobias Weiblen, Michaela Csik and Oliver Gassmann (2013)

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The final version of this manuscript is published in the *International Journal of Product Development*, 18: 249-273.

The final publication is available at the following link at www.

<http://inderscience.metapress.com>:

<http://inderscience.metapress.com/content/6t2281010717281x/fulltext.pdf>

DOI: 10.1504/IJPD.2013.055012

<http://dx.doi.org/10.1504/IJPD.2013.055012>

Please note that differences between this manuscript and the final publication may exist. In case of questions, please contact the corresponding author as indicated below.

The 4I-framework of business model innovation: a structured view on process phases and challenges

Karolin Frankenberger*, Tobias Weiblen, Michaela Csik and Oliver Gassmann

Institute of Technology Management (ITEM-HSG)
University of St. Gallen
Dufourstrasse 40a
CH-9000 St. Gallen, Switzerland
E-Mail: karolin.frankenberger@unisg.ch
E-Mail: tobias.weiblen@unisg.ch
E-Mail: michaela.csik@unisg.ch
E-Mail: oliver.gassmann@unisg.ch
*Corresponding Author

Abstract: Business model innovation has received rising attention as a means for firms to achieve superior performance. Yet, as we argue based on a review of related literature, the research field so far lacks a comprehensive framework that supports managers in their endeavour to innovative their firms' business models. Based on process models from innovation management literature and insights from 14 cases of past business model innovations, we develop the 4I-framework that structures the business model innovation process and highlights the specific challenges which managers face during the initiation, ideation, integration, and implementation of new business models. Through our study, we also provide a conceptual framework to organise existing literature in the business model innovation field and identify promising areas for future research.

Keywords: Business model; business model innovation; business model innovation process; process phases; challenges; incumbent firms

Biographical notes:

Dr. Karolin Frankenberger is an assistant professor at the Institute of Technology Management, University of St.Gallen, Switzerland. Before, she was working for several years as a consultant at McKinsey & Company, helping various clients in topics such as business model innovation and strategic change. She received her PhD in 2004 from the Institute of Management, University of St Gallen, Switzerland, and was a visiting researcher at the Harvard Business School and the School of Business at the University of Connecticut, USA. Her research has been published in the *Academy of Management Journal* and she has been awarded with the "Sumantra Ghoshal Research and Practice Award" and the "Distinguished Paper Award" of the Business Policy & Strategy Division at the 2006 Annual Meeting of the Academy of Management. Her current research interests include business model innovation, strategic networks, innovation ecosystems, strategic initiatives, and strategic renewal.

Tobias Weiblen is PhD student and research associate at the Institute of Technology Management, University of St.Gallen, Switzerland. After obtaining his diploma in business administration from the University of Mannheim, Germany, in 2006 he worked as a business process consultant for SAP, supporting clients from different industries in supply chain optimisation and supplier collaboration initiatives. His research interests include business model innovation as well as open and partner-based business models.

Michaela Csik is a PhD student and research associate at the Institute of Technology Management, University of St.Gallen, Switzerland. In 2008, she obtained a diploma in business administration from the University of Mannheim with specialization in finance and international management. Her research interests include business model patterns, business model innovation and strategic innovation.

Prof. Dr. Oliver Gassmann is professor of Technology Management at the University of St. Gallen, Switzerland, and director of this institute. After completing his PhD in 1996, he was leading research and advanced development of Schindler Corporation, headquartered in Ebikon, Switzerland. Gassmann published in leading journals such as *Research Policy*, *R&D Management*, *Journal of Management*, *Journal of World Business*, *International Journal of Technology Management*, *IEEE Transactions on Engineering Management*, *Harvard Business Manager*. His research focuses on the question of how companies innovate and achieve competitive advantage from innovation.

1. Introduction

Firms like Apple, Southwest Airlines, or IBM are well-known examples of incumbent firms which have successfully innovated their business models. Their renewed success in the market cannot be explained by the mere introduction of new products or services alone but rather by their novel way of doing business as a whole. The companies have managed to develop distinct innovative business models that set them apart from other firms and create additional value for their customers and partners. As the examples illustrate, business model innovation is a powerful tool for a firm to achieve superior performance and, as such, a desirable goal.

While contributions in the field of business models have increased significantly over the last years (Zott, Amit, and Massa, 2011), the majority of research has taken a rather static view on the business model (e.g., Amit and Zott, 2001; Chesbrough and Rosenbloom, 2002; Morris, Schindehutte, and Allen, 2005). The question as to how business model innovations are achieved is thereby widely neglected. Articles dealing with business model innovations tend to focus on widely diverse aspects such as the strategic change antecedents (Doz and Kosonen, 2010), barriers that prevent companies from tackling the challenge of business model innovation (Bouchikhi and Kimberly, 2003; Chesbrough, 2010), or risks underlying the realisation of novel business models (Girotra and Netessine, 2011).

We aim at strengthening the understanding of business model dynamics by exploring the structure and the challenges associated with the business model innovation process. The purpose of our study is to develop a framework which describes the process stages of business model innovation and the key challenges in each phase in order to support managers in innovating their firms' business models. Building on prior research on innovation processes, we identify four process phases which characterise the business model innovation process: initiation, which focuses on the analysis of the ecosystem; ideation, which refers to the generation of new ideas; integration, which deals with the building of a new business model; and implementation, which focuses on the realisation of the new business model. We employ a multiple case study approach based on 14 business model innovation projects within six multinational companies. By analysing the cases through the lens of the four process stages, we identify a comprehensive list of nine key challenges that characterise the specific phases.

The contribution of this paper to the field of business model literature is twofold: First, we add new theory by developing a process framework for business model innovation which has not been existent so far. Second, we build on and extend the initial contributions on various challenges associated with business model innovation by providing a comprehensive list of key challenges structured along the four process phases. We also provide managers with a useful framework to structure their business model innovation process and better master the typical challenges and pitfalls in each of its phases.

Our paper is organised as follows. First, we give an overview of relevant work in the business model, business model innovation, and innovation process model fields. As part of this review, we derive a four-component business model representation and an innovation process framework that guide our study. We identify the lack of an integrative business model innovation framework, which we aim at closing through a qualitative case study approach. We condense our results into the 4I-framework, which we present and subsequently discuss by reflecting the findings against additional insights from related literature streams. Finally, we conclude the paper by stating the managerial and scientific implications of our work.

2. Theoretical background

2.1. Business Models

Before elaborating on business model innovation, it is worthwhile to develop a basic understanding of the business model concept itself. Historically, the business model has its roots in the late 1990s when it emerged as a buzzword in the popular press. Ever since, it has raised significant attention from both practitioners and scholars and nowadays forms a distinct feature in multiple research streams. In general, the business model can be defined as a unit of analysis to describe how the business of a firm works. More specifically, the business model is often depicted as an overarching concept that takes notice of the different components a business is constituted of and puts them together as a whole (Amit and Zott, 2001; Chesbrough and Rosenbloom, 2002; Demil and Lecocq, 2010; Johnson, Christensen, and Kagermann, 2008; McGrath, 2010; Morris, Schindehutte, and Allen, 2005; Osterwalder and Pigneur, 2010) - a notion nicely formulated by Magretta (2002, p.91): *"Business models describe, as a system, how the pieces of a business fit together"*.

Business model literature has not yet converged to a common opinion as to which components exactly make up a business model. To describe the business models throughout our study, we employ a conceptualisation that consists of four central dimensions: the Who, the What, the How, and the Why. Due to the reduction on four dimensions it is easy to use but, at the same time, exhaustive enough to provide a clear picture of the business model architecture.

Who: Every business model serves a certain customer group (Afuah and Tucci, 2001; Chesbrough and Rosenbloom, 2002; Hamel, 2000; Teece, 2010). Thus, it should answer the question *"Who is the customer?"* (Magretta, 2002, p.87). Drawing on the argument from Morris, Schindehutte, and Allen (2005, p.730) that the *"failure to adequately define the market is a key factor associated with venture failure"*, we identify the definition of the target customer as one central dimension in designing a new business model.

What: The second dimension describes what is offered to the target customer, or, put differently, what the customer values. This notion is commonly referred to as the customer value proposition (Johnson, Christensen, and Kagermann, 2008), or, more simply, the value proposition (Chesbrough and Rosenbloom, 2002; Chesbrough, 2010; Morris, Schindehutte, and Allen, 2005; Teece, 2010). According to Osterwalder (2004, p.43) it can be defined as an *"overall view of a company's bundle of products and services that are of value to the customer."*

How: To build and distribute the value proposition, a firm has to master several processes and activities. Those processes and activities, along with the involved resources (Chesbrough and Rosenbloom, 2002; Hedman and Kalling, 2003; Johnson, Christensen, and Kagermann, 2008; Osterwalder, 2004) and capabilities (Morris, Schindehutte, and Allen, 2005), plus their orchestration in the focal firm's internal value chain, form the third dimensions within the design of a new business model.

Why: The fourth dimension explains why the business model is financially viable, thus it relates to the revenue model. Its inclusion into our business model conceptualization is supported by the work of various authors such as Chesbrough and Rosenbloom (2002), Johnson, Kagermann, and Christensen (2008), Mahadevan (2000), Magretta (2002), Morris, Schindehutte, and Allen (2005), and Teece (2010). In essence, it unifies aspects such as, for example, the cost structure and the applied revenue mechanisms and points to the elementary question of any firm, namely how to make money in the business.

A central virtue of the business model is that it allows for a holistic picture of the business by combining factors located inside and outside the firm (Teece, 2010; Zott, Amit, and Massa, 2011). In

this regard, it is often referred to as a boundary-spanning concept that explains how the focal firm is embedded in and transacts with its surrounding ecosystem (Shafer, Smith, and Linder, 2005; Teece, 2010; Zott and Amit, 2008, 2009). The task most commonly attributed to the business model is to explain how the focal firm creates and captures value for itself and its various stakeholders within this ecosystem.

Considering the vast scope that is subsumed under the business model umbrella, it becomes clear that, in the real world, a firm's business model is a complex system full of interdependencies and side effects. Changing - or innovating - the business model can hence be assumed to be a major undertaking that can quickly become more complex than innovating an isolated product or process.

2.2. Business Model Innovation

Although the idea that a firm's business model can be innovated is kind of self-evident, it has only recently been incorporated as a topic in research. Most of the extant literature has adopted a static view, disregarding that business models may be subject to change and must be thus treated as dynamic concepts (Demil and Lecocq, 2010; McGrath, 2010; Morris, Schindehutte, and Allen, 2005; Sosna, Treviño-Rodríguez, and Velamuri, 2010).

At root, a business model innovation can be defined as a novel way of how to create and capture value, which is achieved through a change of one or multiple components in the business model (Amit and Zott, 2001; Chesbrough, 2010; Demil and Lecocq, 2010; Mitchell and Coles, 2003; Teece, 2010). Business model innovations exceed the scope of the mere introduction of a new product or service offering and thus open up completely new opportunities of how to engage in economic exchanges (Hamel, 2000; Mendelson, 2000; Mitchell and Coles, 2003).

Scholars in research have widely acknowledged that business model innovation is a key source of competitive advantage (Baden-Fuller and Morgan, 2010; Björkdahl, 2009; Chesbrough and Rosenbloom, 2002; Chesbrough, 2007; Comes and Berniker, 2008; Hamel, 2000; McGrath, 2010; Mitchell and Coles, 2003; Teece, 2010; Venkatraman and Henderson, 2008). Also, practitioner studies underline its growing importance. Business model innovators have been found to be on average 6% more profitable over five years than pure product or process innovators (BCG, 2008). Consequently, managers consider business model innovation to be more important for achieving competitive advantage than product or service innovation (Economist Intelligence Unit, 2005) and 98% of the surveyed CEOs in a study by IBM (2008) plan to innovate their company's business model in the next three years; more than two thirds of them envisage extensive innovations.

However, despite the perceived importance of business model innovation, the research base in that field is thin. Most scholars so far have solely focused on the importance of business model innovation itself but failed to operationalize this finding by explaining how to systematically innovate the business model. Articles, if any, dealing with this question tend to focus on particular, widely diverge aspects such as the strategic change antecedents (Doz and Kosonen, 2010), the cognitive and asset-related barriers that prevent companies from tackling the challenge of business model innovation (Bouchikhi and Kimberly, 2003; Chesbrough, 2010), or risks (Girotra and Netessine, 2011) underlying to the realisation of novel business models.

In their recent review of business model innovation literature Schneider and Spieth (2012, p.19) conclude that *“business model innovation's core elements and the process of their identification, design, and evaluation remain largely unknown.”* What is missing so far is an integrative framework that comprises the stages that companies go through to come to an innovative business model and helps managers design and implement new business models by identifying the key challenges involved at each stage.

2.3. Innovation Process Models

A prerequisite for providing systematic guidance on business model innovation is to analyse the process that companies innovating their business model follow. First, the phases of the innovation process need to be clearly defined, along with their specific challenges. Hartley (2006, p.38) stresses this point since *“the articulation of processes helps to identify particular barriers and facilitators at particular stages, and this may be of practical help to policy-makers and managers.”* Only few business model scholars so far have spent attention to business model innovations as a process that is composed of phases or process steps. Teece (2010) provides a high-level list of steps that firms should follow to achieve sustainable business models. Mitchell and Bruckner Coles (2004) describe business model innovation as a continuous process and present learnings from successful companies. Osterwalder and Pigneur (2010), finally, propose five subsequent steps to generate new business models. None of them, however, has the ambition of describing the business model’s innovation process as a whole and in the form of an integrative framework.

The discipline of innovation management, in contrast, has a long tradition of analyzing and structuring innovation processes. First concepts - assuming a linear “technology push” of innovations - emerged in the middle of the 20th century, followed by a period of “market pull”-based innovation process models in the late 1960s (Rothwell, 1994). Later studies, however, revealed that innovation processes in reality are seldom linear in nature: they are characterised by discontinuities (Tushman and Anderson, 1986) and are even described as being chaotic (Cheng and Van de Ven, 1996; Van de Ven et al., 1999). Nonetheless, managers and organisations rely on structured schemes to coherently manage their innovation efforts. To accommodate this fact, linear models over the past years have been enhanced to incorporate feedback loops and alternative paths (Gassmann and von Zedtwitz, 2003).

Bucherer, Eisert and Gassmann (2012, p.190) identify *“a similarity between product and business model innovations in regard to the high-level process steps”* but, at the same time, hint at *“significant deviations for the concrete activities performed in these phases.”* We observe these findings in the setup of our study. For the purpose of structuring the high-level framework that captures the essential stages of business model innovations, it seems appropriate to derive a basis from innovation management literature. The concrete details and challenges of the single phases, as well as their interrelation (linear vs. iterative), in contrast, shall be derived empirically.

The models found in innovation management literature describe the innovation process on different levels of granularity and are often tailored to specific innovation types, such as product, process, or strategic innovation (Hartley, 2006). At heart, however, the process models feature a set of common characteristics. In his extensive review of innovation process models in literature Eveleens (2010) concludes that most models presented consist of four *“phases, stages, components, or main activities.”* Based on his work and literature base, we analysed the top six articles (as per their average number of citations per year since publication, according to the Google Scholar search engine) to derive a generic process model that can be applied to describe business model innovations (see Table 1). The first phase, which is often termed initiation, is concerned with the discovery of the need for innovation. That is, the capturing of the initial event, idea, or decision that initiates the entire innovation process. It is followed by a phase of generating innovative ideas as to how to react to the impulse. This ideation phase aims at opening up the solution space and at generating a set of possible alternatives. The third phase, in contrast, takes up one of the promising possibilities and focuses on its elaboration and development – or, as Eveleens (2010) puts it: *“to turn the (selected) idea into some tangible product, process, or service.”* We coin it as the integration phase since the idea is embedded into and integrated with a broader context. The fourth and final phase of the innovation process typically is the one in which the innovation is implemented and brought to the market. These four

generic phases – namely initiation, ideation, integration, and implementation – shall guide our further analysis and framework construction.

Source	Cooper (1990)	Rothwell (1994)	Van de Ven et al. (1999)	Cormican and O’Sullivan (2004)	Tidd and Bessant (2005)	Hansen and Birkinshaw (2007)	
Process Model Name	Stage-Gate	Third-generation model	Innovation process patterns	Basic model of product innovation management	Innovation as a core business process	Innovation value chain	
Phase Arrangement	Linear	Iterative	Iterative	Linear	Linear	Linear	
Innovation Process Phases	Initiation	<ul style="list-style-type: none"> • Preliminary assessment 	<ul style="list-style-type: none"> • New need • New tech 	<ul style="list-style-type: none"> • Initiation period 	<ul style="list-style-type: none"> • Analyse environment and identify opportunities 	<ul style="list-style-type: none"> • Searching • Selecting 	
	Ideation	(for Cooper, the entire process is triggered by an idea)	<ul style="list-style-type: none"> • Idea generation 		<ul style="list-style-type: none"> • Generate innovations and investigate 	<ul style="list-style-type: none"> • Acquiring • Idea generation 	
	Integration	<ul style="list-style-type: none"> • Detailed investigation • Business case preparation • Development 	<ul style="list-style-type: none"> • Research, design, and development 	<ul style="list-style-type: none"> • Developmental period 	<ul style="list-style-type: none"> • Plan project and select sponsor 	<ul style="list-style-type: none"> • Executing 	<ul style="list-style-type: none"> • Idea conversion
	Implementation	<ul style="list-style-type: none"> • Testing and validation • Full production and market launch 	<ul style="list-style-type: none"> • Prototype production • Manufacturing • Marketing and sales 	<ul style="list-style-type: none"> • Implementation/Termination period 	<ul style="list-style-type: none"> • Prioritise project and assign teams • Implement product implementation plan 	<ul style="list-style-type: none"> • Launching • Sustaining • Learning 	<ul style="list-style-type: none"> • Idea diffusion

Table 1: Synthesis of innovation process phases from literature

Although business model scholars so far have rarely taken a process perspective on business model innovations, some of their contributions fit well into this generic four-stage model and thus support its application. The discovery-driven approach proposed by McGrath (2010), for example, is concerned with developing new business models through experimentation in the real world. In the model, her approach can be located in the implementation phase of a business model innovation, with occasional iterations into integration phase to adjust the new business model. A similar learning process is described in a case study by Sosna, Trevinyo-Rodríguez, and Velamuri (2010). The wheel of business model reinvention put forward by Voelpel, Leibold, and Tekie (2004), in contrast, helps managers sense change drivers from the ecosystem surrounding a focal firm and supports the decision if a business model change is a necessary reaction. It hence deals exclusively with the initiation phase of the generic model. Girotra and Netessine (2011), finally, support the ideation phase by demonstrating how thinking about risk can guide a company towards an innovative business model. We will come back to the possibility of using the four generic innovation phases as a means of organizing existing literature during the discussion of our results.

3. Methodology

The intention of our study is to shed light into the structure and challenges associated with business model innovations in order to construct a framework that supports managers in innovating their firms?

business models. Due to the lack of empirical insights into these aspects, a qualitative case study approach is employed (Eisenhardt, 1989; Yin, 2009). In line with our aim to develop a generalizable framework, we choose a multiple case study design to increase the breadth of observations and to obtain richer insights into the common themes.

3.1. Sample Description

Our unit of analysis are past business model innovation projects in established companies. The sample contains 14 cases of past business model innovations and was collected as part of a two-year research project. The cases originate from six multinational firms of different industries, which are headquartered in Switzerland and Germany and involved in the research project:

- MachineCo is a manufacturer of machines for the food industry.
- ToolsCo produces construction tools and related equipment.
- MetersCo manufactures electric meters and smart meters.
- SoftwareCo is a producer of enterprise software.
- TelCo provides telecommunication services (mobile and land-line).
- EngineCo makes turbines and propulsion systems.

Table 2 provides an overview of the selected cases and the business model impact induced by each of the business model innovations.

Case	Company	Description	BM implications (elements changed)
1	MachineCo	Joint venture to market grain fortification system for developing countries.	<ul style="list-style-type: none"> • What: Full solution and know-how instead of machine. • How: Partnership with complementor. • Why: License sales instead of machine sales.
2	ToolsCo	Tool fleet leasing offering.	<ul style="list-style-type: none"> • What: Full-service package instead of machine. • How: New capabilities in sales, logistics, IT, finance, and supply chain. • Why: Monthly fees instead of one-time payment.
3	MetersCo	“Network of knowledge” to increase development efficiency.	<ul style="list-style-type: none"> • Who: New development partners. • How: Open R&D process of managing partners and their skills instead of everything in-house.
4	MetersCo	Energy consumption visualisation product line.	<ul style="list-style-type: none"> • Who: Private end customers instead of utilities. • What: Appealing visualisation and control of energy consumption (“from basement to the living room”).
5	MetersCo	Interface standards for communications across all products.	<ul style="list-style-type: none"> • Who: Communication providers as new partners. • What: Standards-capable meters, no communication hassles for new services.
6	MetersCo	Configurability of products.	<ul style="list-style-type: none"> • What: Product adapts to customer needs. • How: New R&D, sales and marketing skills and processes.
7	SoftwareCo	New support model for corporate customers.	<ul style="list-style-type: none"> • What: Proactive support instead of classical reactive troubleshooting. • Why: Additional premium support fees on top of license and maintenance revenues.
8	SoftwareCo	Cloud-based software for SMEs.	<ul style="list-style-type: none"> • Who: SMEs instead of large enterprises. • What: Full software-as-a-service offering. • How: New infrastructure and processes throughout. • Why: Usage-based monthly fee instead of one-time license sale.

9	SoftwareCo	B2B internet marketplace for collaborative purchasing and design.	<ul style="list-style-type: none"> • Who: Purchasing departments instead of IT. • What: Out-of-the-box collaboration with industry partners. • How: Partnership with start-up company. • Why: Membership fees.
10	TelCo	Digital newsstand.	<ul style="list-style-type: none"> • Who: Newspaper and magazine publishers instead of telecom customers. • What: Access to potential readers. • Why: Revenue share.
11	TelCo	Fiber cable laying robot.	<ul style="list-style-type: none"> • Who: Construction companies instead of telecom customers. • What: 50% more efficient construction. • How: University partnership for development. • Why: Shared cost savings with construction companies.
12	TelCo	Data insurance as part of home insurance.	<ul style="list-style-type: none"> • Who: Home insurance customers. • What: Secure online data backup. • How: Partnership with insurance companies. • Why: Bundling with insurance product.
13	EngineCo	Move from engine supplier of OEMs to full system provider.	<ul style="list-style-type: none"> • Who: End customers instead of OEMs. • What: Branded engines, options, service, support. • How: New capabilities in service, marketing, IT.
14	EngineCo	Entry into stationary engine market.	<ul style="list-style-type: none"> • Who: Electricity producers instead of mobility OEMs. • How: Acquisition of former partially-owned local manufacturer. Use of existing sales organisation.

Table 2: Overview of business model innovation cases

3.2. Data Source

To identify past business model innovation projects, we employed an approach similar to that of McGrath (2001). The CTO or senior innovation manager of each of the aforementioned companies was approached with a list of criteria for identifying business model innovations. In particular, we asked them to identify past projects that had developed significant impact on the components of the firm's business model. We did not give directions with regard to the projects' perceived success as we feel that learning from failed examples can provide valuable insights into the challenges associated with business model innovations and can thus serve as a source of learning (cp. Cope, 2011). We also insisted that key project participants were identified and made accessible to us

Due to practical reasons, such as the global distribution of the contacts provided, initial case data was then gathered through questionnaires that were filled by respondents who had been significantly involved (e.g., as the initiator or project lead) in the respective innovation projects. Questionnaires were structured by the four generic innovation phases identified above and largely consisted of open-ended questions with free-text answers (19 out of 23) to accommodate the exploratory nature of the study. The data generated in the form of 14 comprehensive responses during this first phase was further enriched through follow-up e-mails to clarify specific details.

As the second main source of data, we conducted two full-day focus group workshops with two to three representatives - CTOs and innovation managers - from each of the aforementioned companies. Due to their senior position in the organisation, participants could provide their perception of the cases from a different viewpoint and thus support triangulation. The focus group setting allowed them to add their broader perspective, exchange points of view, expand on questions, and address further aspects (cp. Morgan, 1998). The group discussions and sessions in the two workshops were observed by four researchers, taking notes independently.

3.3. Data Analysis

The initial case evaluation included the thorough review and comparison of the collected data. The free-text questionnaire format proved helpful, as no interview transcripts were required and the responses followed the same structure for all cases. Follow-up questions with regards to the questionnaire data were clarified via e-mail with the respondent directly; in the focus group workshops, questions were clarified immediately. Thus, each case was understood as a single unit and analysed in isolation. By subsequent application of inductive reasoning, themes and categories were identified from the data across cases (Miles and Huberman, 1994) and led to a first draft version of a framework that structured the business model innovation process and identified the most important challenges per phase.

Initial evaluation was followed by an iterative process of enfolding literature (Eisenhardt, 1989), comparing the findings against theory, discussing the findings with other researchers, and generating additional insights from practice. The latter part we achieved by presenting our draft findings in the second focus group workshop. This workshop contributed considerably to the abstraction and generalisation of the findings and allowed us to collect further statements and insights.

After multiple iterations and versions, we could condense the key points identified from the data into the 4I-framework of business model innovation. It is presented in the following section.

4. Results: Development of an integrative framework

This section is structured along the four generic phases of innovation processes: initiation, ideation, integration, and implementation. None of the respondents of our questionnaire raised questions or concerns with regards to the meaning of the phases or how the events of the specific case should be divided into them. We hence feel confident that the phases are a good high-level representation of a business model innovation process. For each phase, we explore the exact meaning in a business model innovation context and present the key challenges associated with the single phase. Results are enriched with quotes from the focus groups and from the questionnaires. At the end of the section, we reflect on the observed nature of the process (linear vs. iterative) before we condense our findings into an integrative framework. The 4I-framework of business model innovation which we develop describes the overall structure of the business model innovation process. It includes the phases, as well as their sequence, and summarises the key challenges of each phase.

4.1. Initiation

The initiation phase in business model innovation processes can be described by activities which focus on the understanding and monitoring of the surrounding ecosystem of the innovating firm. The ecosystem comprises players such as customers, suppliers, competitors, universities, or governments and immediately influences the operations of the focal firm. We identified two main challenges within the initiation phase, which were frequently outlined throughout the questionnaires and the focus groups. The first challenge refers to the *understanding of the needs of the players*. Their needs and moves influence the focal company and often set the starting point for a change of business model. Therefore, it is important to monitor them closely. In nine cases, contacts with customers, suppliers, or complementors marked the starting point of the innovation; competitor moves such as business model or pricing changes, as well as new offerings, are mentioned as well. A CTO in our focus group emphasised the importance of players as the starting point for business model innovations as follows: *“The last big business model innovation in our company was triggered by our customers. They had the need to get something really different.”*

A second challenge within the initiation phase is the **identification of change drivers**, which can also initiate business model changes. Technology changes, such as digitisation, and regulatory changes are mentioned as such events that triggered the re-thinking of the business model. One participant explained this challenge as follows: *“Today changes in the environment or in technology happen so rapidly that it is really difficult to keep up with them, but this is a key precondition for successful business model innovations and a key success factor for our firm.”* In case three, for example, a regulatory change brought new and unexpected competition into the market and caused MetersCo to rethink the business model. In the initiation phase, firms need to identify changes in the environment and in technology in order to be able to respond to those changes with adequate innovations.

Case two, which represents a very successful and industry-changing business model innovation, illustrates the importance of mastering the identified challenges. The impulse to think about a new business model arose from ToolsCo’s ecosystem, which the company understood particularly well. With two thirds of its 20,000 staff working in sales and having regular end customer contact, ToolsCo had more a partner- than supplier-type relationship with its customers and could develop a clear sense of their needs. The central need of a construction company with regards to tools was to have a functioning tool available when needed at the construction site – not to physically own a ToolsCo product and take care of its whereabouts, maintenance, and replacement. At the same time, lower-end competitors were catching up technology-wise and jeopardised ToolsCo’s profit margins in tool sales. Compared to them, ToolsCo identified two unique features that it could exploit: outstanding product quality, leading to a very competitive TCO for its high-end tools, and the direct sales model. Based on this deep understanding of its ecosystem, the company decided to rethink its business model.

4.2. Ideation

Ideation, the second phase in the generic innovation process, also has its meaning and specific challenges in the business model innovation context. It focuses on the generation of ideas for potential new business models. More specifically, it is concerned with the transformation of opportunities, which are identified in the initiation phase, into concrete ideas for new business models.

Our findings outline that there are three main challenges during the ideation phase: First, our interviewees stated that they have *difficulty to overcome the current business logic* and to *think out-of-the-box*, as teams are locked into the logic used by the current business model and industry. “Industry laws” are rarely challenged, as is underlined by the fact that, for five of the cases analysed, competitors were the main source of inspiration during ideation. As outlined by one of the CTOs in the focus group: *“It is so difficult to break out of the dominant logic of the company and of the industry when you have been working within this company for many years, which is the case for most of our managers.”* Hence, overcoming the current business logic is the first key challenge for the ideation phase. Second, managers report *difficulties to think in business models*, as they are used to think solely in new product developments when trying to solve a problem. One of the innovation managers nicely termed this the *“business model thinking attitude”* that is missing. Or, as outlined by another innovation manager: *“Almost our entire R&D budget is focused on product development. How should we think about business models in such a setting?”* Third, our interviewees argue that there are **no systematic tools to develop new business model ideas**, as becomes apparent in the following quote: *“We have multiple tools and methods to come up with new ideas for products but there is nothing to support idea generation for business models.”* This shortage is also underlined by the results of the questionnaires: The question as to which methods and tools are used to develop business model ideas shows a big diversity of answers. The biggest cluster is “none / unknown” with eight of the cases; value chain analysis and market research, which are generic methods not tailored to business model idea generation, are used by three cases.

In contrast to these analytic approaches, TelCo (cases ten to twelve) applies more creative brainstorming and pitching workshop formats to arrive at new business model ideas. External experts and ideas are brought into the ideation process which, according to the head of the innovation department, helps overcome some of the challenges identified. Overall, however, there does not seem to exist the one best method to purposefully create ideas for new business models.

4.3. Integration

The third phase typically used in innovation processes, the integration phase, also plays its role for business model innovations. The activities within this phase focus on the development of a new business model based on promising ideas identified in the ideation phase. They need to be transformed into a complete and viable business model. Using the four dimensions (who, what, how, why) of a business model as the lens to look at our cases allows for an interesting insight: typically, the idea initially determines the ‘What’ and/or ‘Who’ component of the future business model, whereas the revenue model (‘Why’) and value chain architecture (‘How’) are added during integration phase. Put differently, the marketing-driven product/market combination perspective prevails in ideation.

Based on our discussions within the focus groups, two major challenges were identified in this phase. The first challenge is that companies struggle to *integrate all pieces of their new business model*. As outlined by one CTO in our focus group: *"Changing one piece of the business is easy but aligning the rest is where it gets tricky."* This aspect is not sufficiently considered by the finance-driven approaches, namely business cases and (to a lesser extent) business plans, which are typically used. A lack of integration of the business model dimensions can lead to difficulties or even failure in the implementation of the new business model. In case 14, for example, the existing global sales organisation should be used to market a different line of products. This decision was found to be *"the main reason for the lack of success in the first place"* and was revised after the first year on the market. Similar challenges with the sales force were present in case nine, whereas the need to up-skill sales representatives for the new business model was identified in advance and successfully actioned upon by case two.

The second challenge for the integration of the business model is the involvement and *management of partners*. As the new business model needs to be aligned and integrated with the partners’ business models, complexity arises that requires *"a lot of energy and ability to convince"* and *"long discussions that resulted in complex agreements"* (questionnaire quotes). The challenge identified here is different from the one identified during the initiation phase, although both refer to partner interaction. During initiation phase, the challenge is to understand the needs, pain points, and opportunities in the firm’s ecosystem in order to identify a starting point for a new business model. Here, during integration phase, the challenge identified refers to the integration of partners into the design of the concrete new business model. The new model can only work if all involved stakeholders support it and adjust their business models accordingly. Hence, firms need to manage their partners actively.

A closer look at the integration phase of the ToolsCo case underlines the importance of managing the identified challenges. The company invested substantial time and efforts to develop the new idea, which focused on a more service-oriented value proposition, into a consistent business model that would also address the 'Who', 'How', and ‘Why’ dimensions. The target customer – or 'Who' dimension – was consciously decided to stay the same in the new business model. The 'How' dimension, in contrast, required more changes to ToolsCo’s value chain. Sales had to develop a training concept to be prepared for its new counterparts. Instead of selling tools to the site foreman, sales representatives would in future need the skills to negotiate big multi-year service contracts with senior executives. Logistics and supply chain required new concepts to ensure ToolsCo’s availability promise and manage the collection of tools that were returned after contract expiry. Lastly, IT

capabilities that would allow both ToolsCo and its fleet management customers to manage the tool population had to be developed. Defining the revenue model ('Why'), finally, was completely new ground for ToolsCo which had so far sold its products and earned additional money through maintenance and consumables. With the new option, ToolsCo replaced big one-time sales with smaller regular revenues and therewith took over assets from its customers' balance sheets. During the entire integration phase, the new business model was discussed with selected key customers to ensure its fit with their expectations and business models.

4.4. Implementation

The last generic innovation process phase, implementation, is clearly a crucial point in time for business model innovations, too. Once fully designed and integrated, the new business model can be implemented - which typically involves huge investments to be made and risks to be taken by the focal firm. In contrast to product innovation, where early prototypes can be shared and evaluated with customers during their development, a new business model often needs to be fully implemented before it can be tested in reality.

As one CTO in our focus group stated, implementation of a new business model can be the hardest task of all: *"The most challenging thing with business model innovation is to successfully implement the new business model. Only if you convince everybody of the new business model and get their full commitment, you can be successful."* This statement hints at the first of two major challenges that we identified for the implementation phase. The challenge to **overcome internal resistance** became obvious in almost all of the cases. People are reluctant to change due to the fact that they are afraid of the new situation or due to the fact that they do not see a reason to change, as the old business model is still working well. Managing organizational change is not an easy task per se, and the overarching scope of the business model that requires changes to many different areas within the firm makes it even harder. In this phase, it is important to communicate openly and explain how the new business model can help the company. For case one, our contact pointed out that *"many employees did not understand the product and how we wanted to sell it"* – which is not a good prerequisite to enter a new market.

A second challenge, which was reported throughout the questionnaire and the focus groups, is to manage the chosen implementation approach. Typically, **pilots, trial-and-error, and experimentation** are employed to mitigate risk in the implementation process. "Big bang" approaches, as applied by case seven, are rarely used when a new business model is implemented. Rather, firms follow a cautious strategy of taking small steps toward the realisation of the business model such as test pilots or market experiments. The critical challenge is to ensure that learnings from these actions are then used to fine-tune the business model or to perform larger adjustments if required. The approach of trial-and-error learning pays off: in almost all of the cases that applied it, subsequent adjustments were made to the new business model. Only after one or several iterations of the cycle, these companies decided to fully roll out the new business model. In line with the step-wise approach identified, new business models are typically rolled out by market/country. This is by far the dominant approach used (two cases rolled out by customer group) and also allows to make specific adjustments on a per-country basis.

4.5. Nature of the business model innovation process

Are the phases in the business model innovation process arranged in a strictly linear fashion or is the process characterized by loops, iterations, and alternating paths? This question was consciously kept open in our earlier derivation of the business model innovation phases from innovation management literature, as innovation process models differ in their perception of this issue (cp. Table 1). For

business model innovations, our data speaks a clear language in this regard: there are occasions of iterations between phases in almost all of the cases analysed.

Most commonly, iterations between the integration and implementation phases can be observed. Whenever a business model did not work out as planned, the surveyed companies undertook subsequent adjustments in its design. That is, they went back from implementation into integration phase to adjust one or more of the new business model's dimensions. In case eight, for example, this back-and-forth between phases spanned multiple years and is still on-going as the new offering matures. With its new business model, SoftwareCo entered a market that was new to the organization, in combination with a technology that was new as well. Initially, changes to the "How" dimension of the new business model became necessary when the technology platform and data centre strategy had to be readjusted. Subsequently, first market reactions led to a redefinition of the "Who" dimension to also include foreign subsidiaries of large enterprises (instead of SMEs only) and to focus more on service industry customers as opposed to manufacturing companies. Similarly, for case 7, SoftwareCo had to rework the value proposition ("What") of its new business model after the initial market launch and continued to offer the old support model as an option to existing customers who did not agree with the new terms.

Iterations between earlier phases can be observed as well. TelCo in case ten, for example, originally had the idea to launch its new offering on own branded devices for consumers. During the integration phase, however, it turned out that the idea was *"too optimistic concerning the availability of compelling devices"* and that appropriate hardware partners could not be identified. Hence, the project team had to go back into ideation and develop an alternative approach which considered these restrictions. Even the initiation phase was revisited occasionally by some cases, as it makes sense to periodically realign the on-going business model innovation activities to changed conditions in the company's environment. In case one, for example, a food scandal in China severely decreased the assumed market expectations underlying the new business model. New ideas were needed that led to an adjustment of the business model before its implementation.

Despite these iterations between phases, the business model innovation process as observed in our cases seems to be rather structured overall. Apart from case 12, which directly was initiated by "a bright idea", all cases went through all of the four phases identified earlier. Except for iterations, their sequence was kept and we found a huge overlap in the activities and associated challenges described for each phase. For the purpose of supporting managers in their business model innovation efforts, it hence seems appropriate to condense the findings into an idealised representation of the entire process.

4.6. The 4I-framework of business model innovation

Based on the results of our study, we developed an integrative framework which encompasses the structure and challenges associated with business model innovation. The framework consists of four phases which were derived from innovation management literature and adapted to business model innovation processes through the exploratory study of the 14 cases. Within each phase we identified various challenges: In the initiation phase, which focuses on the analysis of the ecosystem, the challenges are to understand the needs of the players within the ecosystem and to identify relevant change drivers. In the ideation phase, which refers to the generation of innovative ideas, managers need to overcome the current business logic, focus on business model thinking, and apply tools for the creation of business model ideas. In the integration phase, which is concerned with the building of a new business model, the challenges are to ensure that all pieces of the new business model are integrated and that the relevant partners are involved. The last phase, the implementation or realisation phase, includes two major challenges. The innovating firms need to overcome the internal resistance and implement the new business model in a step-by-step process including pilots, trial-and-error and

experimentation. The first three phases - initiation, ideation and integration – can be summarised into the meta-phase “design”, as they focus on the business model development with respect to content. The last phase, implementation, in contrast focuses on the commercialisation of the content and thus the “realisation” of the new business model.

Although the phases seem to form subsequent steps within a linear process, this is not the case. The framework rather displays an iterative process with multiple steps forth and back - only such a framework is able to fully capture systematic business model innovation. There are three major iterative loops built into the framework. The first one refers to the regular alignment between the constantly changing ecosystem and the generated ideas for business model innovation - it is required to ensure the external fit of the new business model. The second one emphasises the alignment between the generated ideas and the components of the business model, as well as the alignment of the business model dimensions themselves - we term this the internal fit which has to be achieved. The third iterative loop stresses the alignment between the design phase as a whole and the realisation phase. Put differently, experiences made during realisation can require adjustments of the business model, as it is recognised that the planned design does not work in real life. This iterative loop is crucial in order to finally develop a business model that can be successfully implemented. As all factors can change over time, it is important to review the framework and especially the existence of the fits or misfits between the single phases of our framework regularly. The integrative framework is displayed in Figure 1.

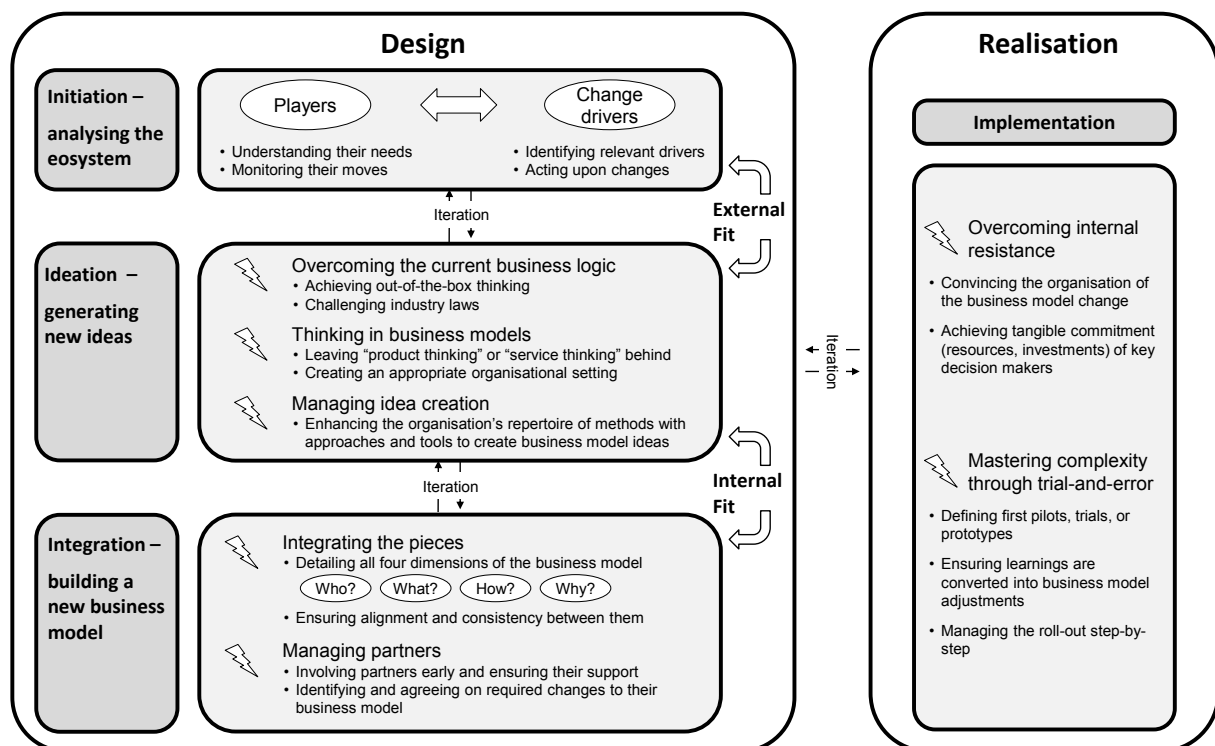


Figure 1: The 4I-framework - Phases of the business model innovation process and their key challenges.

5. Discussion

The main insights of the study are twofold: First, we show that the process of innovating a firm’s business model resembles other innovation processes and can thus be structured into four phases,

which are iterative in their nature. Second, we identify a comprehensive list of major challenges within the single process phases. Research in the field of business model innovation has not yet focused on a process view of business model innovation. Scholars only highlight the importance of business model innovation (e.g., Mitchell and Coles, 2003; McGrath, 2010; Morris et al., 2005), without showing how the innovation takes place.

Our findings outline that business model innovations can be structured along four phases which are to some extent linear but at the same time iterative in their nature. We want to elaborate on this inherent paradox between structure and iteration in more detail. Managers need some structured schemes and guidance to coordinate their efforts for business model innovation. Put differently, some rough cause-and-effect relationships help organizations navigate their business model innovation efforts into the right direction. However, the actual process that takes place is much more complex and chaotic than the predefined structure. We identified three major feedback loops within the business model innovation process. The first one refers to changes in the ecosystem, such as the development of a new technology or new customer needs, which requires an adaptation in the early-stage innovation activity, the ideation phase. This is what we call the external fit. The second feedback loop refers to the internal resources which can call for adaptations of the aspired innovation during the integration stage. If, for example, a firm tries to develop a business model innovation which does not fit to the natural resource base, the innovation needs to be adapted. The third feedback loop refers to the experiences made in the implementation phase, which can trigger changes in the overall business model concept. Hence, our framework captures the inherent paradox between structure and process through combining a linear structure with iterative feedback loops at each stage. This finding is in line with previous research on innovation processes, which outlines the need for structure and linearity on the one hand and complexity and iterative loops on the other hand (e.g., Gassmann and von Zedtwitz, 2003; Kline, 1985; Kline and Rosenberg, 1986; Roy and Cross, 1983).

Our study provides a comprehensive and detailed list of major challenges during the business model innovation process. While none of the previous contributions in the business model innovation field provides a complete list of such challenges, various scholars emphasise selected challenges. In the following we elaborate on these in more detail.

The initiation phase is characterised by the challenge to discover and react on triggers from two external sources: from other players in the ecosystem and from change drivers that have the potential to change the entire ecosystem. This finding is in line with other researchers in the business model field. Zott and Amit (2009), for example, highlight the important role that the ecosystem plays for business model success. The importance of understanding the customer and his needs as a starting point for new business models is a theme that is found frequently, for example in Girotra and Netessine (2011) and Kim and Mauborgne (2004, 2005). Similarly, change drivers have found their way into business model research: Tankhiwale (2009), for example, analyses regulatory changes and their effects on telco business. A vast number of authors have identified technology to be a key driver for business model change (Chesbrough and Rosenbloom, 2002; Chesbrough, 2007). Chesbrough (2010, p.356), for example, highlights the difficulty of creating a business model based on an innovative technology as follows: "*[they] literally did not know what to do with these technologies, which became 'orphans' within the company.*" Most prominently, the advent of internet technology has triggered many new business models (Timmers, 1998). Calia, Guerrini, and Moura (2007) show how technological development can ultimately lead to a new business model. Chesbrough and Rosenbloom (2002) show in their case study on Xerox that developing a new business model was of critical importance for the company's spin-offs to commercialise their innovative technology. Björkdahl (2009) draws a similar conclusion from three cases of ICT integration into existing mechanical engineering products. He argues that this cross-fertilisation can create immediate value for the user of

the product through improved functionality or performance. Capturing – or appropriating – a share of that additional value, however, requires changes to the business model of the manufacturer.

The key challenges of the ideation phase are to overcome the current business logic, to focus on business model thinking, and to develop tools for the creation of business model ideas. With respect to overcoming the current business logic, few business model scholars have identified the barriers that block the road towards the identification of innovative business models, yet more on an organisational level (Bouchikhi and Kimberly, 2003; Chesbrough, 2010). The other two challenges, the necessary focus on business model thinking rather than on product innovations and the lack of tools and processes, has not been in the focus of previous business model scholars. Only Chesbrough (2010, p.356) refers to these challenges and thus supports our finding: *“Like Xerox, however, companies have many more processes, and a much stronger shared sense of how to innovate technology, than they do about how to innovate business models.”* Closely related literature on product innovation has also identified the need for tools and processes to guide managers in the complex process of generating new ideas (Altshuller, 1973; Goldenberg et al., 2003).

Considerably more has been written about the design of business models around a new idea, namely the integration phase. Our results show that one challenge is to integrate all dimensions of a new business model in order to come up with a successful solution. Previous research has already highlighted the importance of aligning the individual parts of business models, thus underlining our findings. Some outline that the design of one dimension or component is likely to affect the others and vice versa (Casadesus-Masanell and Ricart, 2011; Morris, Schindehutte, and Allen, 2005). Teece (2010, p.188) suggests that they must be *“designed with reference to each other”* and outlines the importance of the integration task as follows: *“without a well-developed business model, innovators will fail to either deliver - or to capture - value from their innovation”* (p.172). The second challenge within this phase refers to the management of partners during the design and commercialisation phase. This finding is in line with recent contributions in the business model field which highlight the importance of partner management and partner integration in the business model. Scholars argue that business models are boundary-spanning concepts (e.g., Shafer, Smith, & Linder, 2005; Teece, 2010; Zott & Amit, 2008, 2009) and that one major task of the business model is to create and capture value for itself and its various stakeholders (e.g., Amit & Zott, 2001; Björkdahl, 2009; Chesbrough, 2007; Chesbrough & Rosenbloom, 2002; Magretta, 2002; Shafer et al., 2005; Teece, 2010). Hence, all stakeholders need to support the new business model, otherwise it will not work, and therefore they need to be managed actively (Adner and Kapoor, 2010).

A new business model’s implementation, finally, is the last phase of the innovation process. The first challenge within this phase is the internal resistance which needs to be managed. A few researchers in the business model field have outlined this challenge, as they argue that business model implementation is difficult due to its conflict with the existing business model or with underlying structures (Amit and Zott, 2001; Christensen, 1997, 2003). The second challenge is that successful implementation requires step-by-step implementation including experimentation and learning. McGrath (2010, p.253) argues in a similar vein by stating that new business models are often highly uncertain, making it *“difficult to know in advance how best to take of advantage of them”*. As a consequence, McGrath and others suggest that business model innovation is best achieved through a process of experimentation and learning, meaning that the business model is implemented and adjusted in iterative stages based on the experiences made in the field (McGrath, 2010; Morris, Schindehutte, and Allen, 2005; Sosna, Treviño-Rodríguez, and Velamuri, 2010; Teece, 2010). This sentiment is put down in a nutshell by Chesbrough (2010, p.356) who argues that business model innovation *“is not a matter of superior foresight ex ante - rather, it requires significant trial-and-error, and quite a bit of adaptation ex post.”*

6. Implications and Conclusions

We started this paper with the ambition to explore the structure and the challenges associated with business model innovations in order to derive a framework that supports managers in innovating their firms' business model. The resulting 4I-framework, which is based on a four-phase model of the innovation process, concisely presents the structure of the process and the challenges that managers face during the initiation, ideation, integration, and implementation phases. It draws its empirical foundations from real world cases and also visualises major interrelations between the phases that are of particular relevance for practitioners. As such, we believe it can be a useful guideline for managers to implement a structured and systematic business model innovation process in their organisations.

In our work with practitioners we often experience that managers are overwhelmed by the task of developing and implementing innovative business models. The topic is hyped in the popular press and shareholders consequently expect business model innovations to happen. Yet, given the newness of the field, there is a lack of structure and proven management knowledge in practice. Managers expect concrete guidance from the academic world but, so far, have to identify and bring together the useful bits and pieces from a dispersed literature base. By collecting the most common challenges of business model innovation and structuring them into a process model, the 4I-framework allows them to better plan their endeavours. Fully aware of typical pitfalls, they can proactively avoid them upfront through their consideration in aspects such as team composition, stakeholder management and project setup. The framework can hence be seen as the first step in the development of a toolbox for practitioners that condenses the essential knowledge required to successfully innovate business models.

To business model innovation literature, the 4I-framework contributes in two ways: First, it develops a process model of business model innovation and, second, it offers a comprehensive list of challenges which arise during business model innovations. As the discussion of our results shows, research so far has not developed a process model for business model innovation and, although challenges have been mentioned in various publications, there is a lack of comprehensiveness and structure in their presentation. Our framework integrates the quite dispersed literature on the subject; it helps organise existing contributions and to identify the "blind spots" of business model research. While we find the initiation, integration and implementation phases extensively covered in literature, fewer results are available for the ideation phase of the business model innovation process.

Creating such an eclectic model is often challenging. Dunning (2000) outlines three criteria which justify the development of eclectic models: First, the sum of the value of the single theories must be greater than the whole. We believe that this is the case with our 4I-framework as, so far, business model innovation theory lacks an integrative framework on how to innovate business models. Second, such a model should allow predictions about the phenomena studied. We think that our framework offers a guideline how managers can innovate their business model. Third, a model is judged to be robust if it addresses relevant problems and offers a conceptual structure for resolving them. Our framework helps organise existing contributions and to identify the "blind spots" of business model research. While we find the initiation, integration and implementation phases extensively covered in literature, fewer results are available for the ideation phase of the business model innovation process.

Further research could for example build on the framework and provide additional insights into the ideation phase, which has so far been widely neglected. Contributions from business model scholars that provide systematic ways of generating ideas for new business models would, as per our estimation, greatly benefit practitioners in their business model innovation efforts. The 4I-framework can thus serve as basis for further empirical research in the important area of business model innovation.

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