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Summary

Business model innovation has attracted considerable attention in recent academic literature and in practice. A business model summarizes the logic and architecture of the manner in which an organization creates, delivers, and captures value. The ability to develop, adjust and, if necessary, replace business models is considered central to a firm's dynamic capabilities. This PhD dissertation contributes to the understanding of business models as a subject of innovation, expanding the traditional dimensions of product and process innovation. This dissertation comprises a general introduction, three essays, and a conclusion.

The first essay focuses on the role of industry structure in business model innovation. This essay employs a large cross-industry database to develop a methodology that enables the analysis of business model innovation and provides broad empirical evidence. The second essay explores the contribution of crowdsourcing-based search approaches to the process of business model innovation. The third essay analyzes and evaluates an ongoing business model experiment in the recorded music industry.

Overall, this thesis contributes to the emerging research field of business model innovation. The three essays in this dissertation collectively contribute to the understanding of business model innovation, examining business model innovation in three different contexts and using various methods and datasets. In particular, the main contributions include the development of an empirical measure, the analysis of industry-level antecedents, and the use of crowdsourcing to generate business model ideas.

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CHAPTER 1: INTRODUCTION

Since the publication of Schumpeter's *The Theory of Economic Development* in 1934, an extensive amount of research has been published in the economics and management literature that emphasize the importance of innovation as a determinant of change and growth. Schumpeter identified five sources of innovation: the introduction of new products, new production methods, the exploitation of new markets, the discovery of new supply sources, and new ways to organize business (Schumpeter, 1934). For years, researchers have focused on the first two innovation types, namely product and process innovation (e.g., Utterback and Abernathy, 1975; Damanpour and Gopalakrishnan, 2001; Dewar and Dutton, 1986; Filson, 2002; Klepper, 1996; Leiponen and Helfat, 2010; Shan, Walker, and Kogut, 1994).

This dissertation focuses on the last type of innovation—new ways to organize business—that is currently referred to as business model innovation (Casadesus-Masanell and Zhu, 2013). As a topic, business model innovation has gained considerable attention in recent academic literature (e.g., Baden-Fuller and Mangematin, 2013; Casadesus-Masanell and Zhu, 2013; Zott, Amit, and Massa, 2011) and in practice (e.g., Pohle and Chapman, 2006). The main drivers of this interest include the increasing options and opportunities for business model (re-)configurations enabled by the advent of the Internet (Amit and Zott, 2001), rapid growth in emerging markets (Thompson and MacMillan, 2010), expanding industries dependent on post-industrial technologies (Perkmann and Spicer, 2010), and changing customer preferences and deregulation (Casadesus-Masanell and Zhu, 2013).

Despite the high levels of interest and the consensus that the ability to develop and modify business models is central to a firm's dynamic capabilities (Teece, 2007), business model innovation remains a “slippery phenomenon” to study (Casadesus-Masanell and Zhu, 2013:480). Similar to the research on business models, the literature on business model innovation is fragmented and developing across various fields,

among them innovation management, strategic management, and entrepreneurship (Schneider and Spieth, 2013; Zott *et al.*, 2011). The vagueness and inconsistencies are rooted in the missing solid theoretical anchoring of the business model concept (Spieth, Schneckenberg, and Ricart, 2014; Teece, 2010)

What is a business model? More recent definitions consider business models as the “design or architecture of the value creation, delivery, and capture mechanisms” (Teece, 2010:172) that are employed by an organization. The manner of commercialization of new ideas is of decisive importance for the economic outcome (Magretta, 2002 Chesbrough, 2010). Business performance and the choice of business model significantly correlate (Chesbrough and Rosenbloom, 2002; Williamson, 2010). Many definitions of business models and different approaches to the construct have been presented and discussed (e.g., Baden-Fuller and Morgan, 2010; Casadesus-Masanell and Ricart, 2010; Chesbrough and Rosenbloom, 2002; Demil and Lecocq, 2010; Johnson, Christensen, and Kagermann, 2008; Morris, Schindehutte, and Allen, 2005). Despite the growing body of literature around business models, however, there is no commonly agreed definition of a business model (Desyllas and Sako, 2013; George and Bock, 2011). Nonetheless, there is growing consensus that business models describe the manner in which a firm creates, delivers, and captures value (Massa and Tucci, 2013; Zott *et al.*, 2011).

In accordance with prior literature, I consider business models as a subject of innovation, expanding the traditional dimensions of product and process innovation (Massa and Tucci, 2013; Zott *et al.*, 2011; Mitchell and Coles, 2003). As a result, firms can also compete through their business models (Casadesus-Masanell and Zhu, 2013). According to Chesbrough (2007), business model innovation may have more strategic implications than other types of innovation. Thus far, the differences between strategy and the business model construct are subject to an extensive debate (e.g., Baden-Fuller and Morgan, 2010; Sabatier, Mangematin, and Rousselle, 2010; Teece, 2010; Zott and

Amit, 2008). Most authors consider strategy and business models as conceptually distinct, but partially disagree on the differentiating factors (Klang, Wallnöfer, and Hacklin, 2014).

This thesis aims to contribute to the emerging research field of business model innovation on several dimensions. (1) to contribute to the research on business models and business model innovation by expanding the methodological possibilities available to study the phenomenon. To that end, I echo the call from researchers to add empirical support to the findings proposed within previous literature on the topic. (2) to add to the understanding of what drives business model innovation beyond the organizational level. Research on the antecedents of business model innovation has thus far mostly focused on the firm level (e.g., Sosna *et al.*, 2010, Chesbrough, 2010, Amit and Zott, 2001). Business model innovation is regarded as a complex task with a highly uncertain outcome (e.g., Sosna *et al.*, 2010, Im and Cho, 2013). (3) to explore ways to ease the complexity in the process of business model innovation, using crowdsourcing and experimentation.

This thesis comprises three essays on business model innovation and combines quantitative and qualitative approaches. Table 1 summarizes the approach and the areas of contribution of each essay. The following section comprehensively presents the literature gaps and research question addressed in each essay.

Table 1. Summary of approaches and areas of contribution

Essay	Approach	Area of contribution
1	Empirical quantitative	– New methodological approach to measure business model innovation – Analysis of industry-level antecedents in business model innovation
2	Explorative quantitative	– Ways to reduce complexity of business model innovation – New methodological approach
3	Explorative qualitative	– Ways to reduce complexity of business model innovation – The role of experimentation

Literature gaps and research questions

While all the studies in this dissertation are within the main topic of business model innovation, they address different literature gaps.

As Schneider and Spieth (2013) observe, most literature on business model innovation is explorative in nature, and very little empirical evidence is available. Essay 1 uses a large cross-industry database to develop a unique measure for business model innovation and provides broad empirical evidence. In addition, it addresses a second important gap in the business model literature—i.e., the role of industry structure in business model innovation. Thus far, relatively few studies have explored the role of industry-level antecedents in business model innovation, which is surprising, given the relevance of business model innovation for sustaining economic success (e.g., Teece, 2010).

Essay 2 is located at the intersection of business model innovation and open innovation. While crowdsourcing is increasingly considered as a method of opening up a firm's business model to external partners and particularly customers (e.g., Bogers, Afuah, and Bastian, 2010; Djelassi and Decoopman, 2013), few studies have investigated the role of crowdsourcing in the business model innovation process.

Considering the need to reduce the risks and uncertainties in business model innovation (e.g., Chesbrough, 2010) and the potential benefits of involving large crowds in idea generation (e.g., Afuah and Tucci, 2012), Essay 2 investigates the contribution of crowdsourcing to the process of developing new business model ideas.

Essay 3 focuses on business model experimentation in the recorded music industry. Several authors consider business model experimentation as crucial for finding new ways to create, deliver, and capture value for industries (e.g., Baden-Fuller & Morgan, 2010; Chesbrough, 2007, 2010; McGrath, 2010). Several recent studies focus on business models in the recorded music industry (e.g., Hougaard and Tvede, 2010; Moyon and Lecocq, 2010; Vaccaro and Cohn, 2004), as the ways in which music is produced, delivered, and consumed has fundamentally changed through digitization (Tschmuck, 2012). Essay 3 analyzes and evaluates a business model experiment in the recorded music industry.

Methodologies and data collection

The three essays in this dissertation represent different research questions requiring various methods and datasets. The methodological variety, including quantitative and qualitative methods, helps to capture the business model phenomenon in its holistic nature.

Essay 1 poses a general question regarding the dynamics of business model innovation, regardless of specific contexts. For this study, a cross-section survey is appropriate. Content analysis is used to construct the business model innovation measure. Several statistical methods are employed in the data analysis. To evaluate the use of crowdsourcing for business model innovation in Essay 2, we launched an idea generation contest to collect business model ideas from users. Again, Essay 2 utilizes statistical methods in combination with content analysis. Data analysis in Essay 3 applies qualitative data as it examines explorative questions regarding emerging

business models. In particular, it uses case study analysis as well as inductive content analysis. Table 2 summarizes the data sources, data characteristics, contexts, and methods employed. The following section overviews each of the three essays.

Table 2. Data sources, sample size, context, and method

Essay	Data sources / Data collection	Sample size	Context	Statistical methods	Qualitative methods
1	Community Innovation Survey 2010, Austrian structural business statistics, multi-stage expert rating	1,242 firms	Austrian firms with more than 10 employees	Negative binomial, Tobit, Poisson, and Instrumental variables regressions	Content analysis
2	Idea contest, self-collected survey data, multi-stage expert rating	418 users	Swedish podcast industry	Negative binomial and OLS regressions	Content analysis
3	Expert interviews, public data from record releases	3 projects, 3 interviews	Recorded music industry		Case study analysis, inductive content analysis

Overview of essays

The three essays in this dissertation offer a more nuanced view of the manner in which firms can manage and utilize business model innovation. Furthermore, I will briefly discuss the research objectives, method, and main contributions of these three essays.

Antecedents and consequences of business model innovation: The role of industry structure (with Marion Poetz, Christoph Grimpe, and Markus Eurich)

This essay investigates the role of industry structure in business model innovation. Given the importance of a business model as a means for achieving competitive advantage (e.g., Teece, 2010), it is surprising that relatively little is known

regarding the factors that may lead particularly incumbent firms to change components of their business models. In fact, findings from previous studies suggest the need to further investigate the drivers of business model innovation (Chesbrough and Rosenbloom, 2002; George and Bock, 2011; Zott and Amit, 2007). Thus far, almost all available evidence is confined to firm-level antecedents, such as cognitive closure of firms (Chesbrough, 2010), organizational inertia (Sosna, Treviño-Rodríguez, and Velamuri, 2010), inertia at the upper management level (Chesbrough and Rosenbloom, 2002; Tripsas and Gavetti, 2000), and conflicts with existing assets (Amit and Zott, 2001).

Comparatively few studies focused on industry structure, particularly the life cycle stage of the industry and competitive pressures. This is surprising, particularly considering Utterback and Abernathy's (1975) seminal contribution regarding the changes in the focus of innovation as an industry eventually develops. Hence, this essay contributes to this debate and incorporates the insights of the model proposed by Utterback and Abernathy into an analysis of how the industry life cycle stage and competitive pressures within industries determine business model innovation.

This essay presents empirical evidence based on a cross-industry sample of 1,242 Austrian firms that participated in the European Community Innovation Survey (CIS) in 2010. For the empirical analyses, we develop a unique measure for the degree of business model innovation by applying an expert rating process to identify the questions in the CIS survey relevant to business model innovation. Thereafter, we assign these questions to the key business model functions of creating, delivering, and capturing value. This method not only examines whether a business model has been changed, but also investigates the relationship between the degree of business model innovation and innovation performance.

We find that the degree of business model innovation is greatest in emerging industries. In addition, we find that competitive pressures negatively influence the

degree of business model innovation. Finally, among firms that introduced new products/processes, the degree of business model innovation positively influences innovation performance.

Crowdsourcing business model innovation (with Marion Poetz)

This essay explores potential new roles for users in business model innovation. In the context of business model innovation, crowdsourcing has thus far been discussed as enabling new types of business models, mostly related to the value-creating function of a business model, such as the generation of new product ideas. Crowdsourcing is increasingly considered as a method of opening up a firm's business model to external partners and particularly customers (e.g., Bogers *et al.*, 2010; Djelassi and Decoopman, 2013). Nevertheless, few studies have investigated the role of crowdsourcing in the actual process of a business model innovation. Given the need to ease the business model innovation process (e.g., Chesbrough, 2010) and the potential benefits from involving large crowds in developing novel ideas and concepts (e.g., Afuah and Tucci, 2012), this essay explores the manner in which crowdsourcing can contribute toward developing new business model ideas.

To answer this research question, we analyze data from a crowdsourcing initiative we designed to collect new business model ideas for Sweden's most popular podcast, Filip and Fredrik's podcast (www.filipochfredrik.com). Together with Filip and Fredrik, we invited podcast users to submit proposals on ways to improve or innovate the business model of Filip and Fredrik's podcast, using Osterwalder and Pigneur's (2010) business model canvas. All participating users were then asked to fill in a questionnaire relating to their characteristics, experiences, and knowledge assets relevant to explaining the novelty and value of their business model ideas. Overall, 422 users submitted a business model idea and completed the survey. Three industry experts evaluated the business model ideas on their novelty and value. We find that

crowdsourcing among users may indeed have a similar value for business model innovation as it has for a new product design.

Business model experimentation in the recorded music industry: Value beyond music
(with Kai Kirkkopelto and Kurt Heidenberger)

This essay focuses on a particular business model experiment in the recorded music industry. When retaining traditional business models based on physical goods, this industry finds it impossible to maintain pre-Internet era profits (Liebowitz, 2006; Michel, 2006; Oberholzer-Gee and Strumpf, 2007). This situation has forced industry incumbents to completely reevaluate and redesign their business models. Moreover, these firms are forced to experiment with new business models to replace falling revenues from their traditional business models. Frequently, when new technologies emerge traditional business models come under pressure and opportunities for new models appear (McGrath, 2010). This essay analyzes an ongoing business model experiment in the recorded music industry. Based on three case studies and interviews with industry professionals, we conclude that it is feasible to offer recorded music as a promotional product, either for free or at a very low cost, and bundle it with more lucrative value-added elements associated with the artist and recording.

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CHAPTER 2: ANTECEDENTS AND CONSEQUENCES OF BUSINESS MODEL INNOVATION: THE ROLE OF INDUSTRY STRUCTURE

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Abstract

What makes firms innovate their business model? Why do they engage in innovating the way of creating, delivering and capturing value? And how does such innovation translate into performance? Despite the importance of business model innovation for achieving competitive advantage, existing evidence seems to be confined to firm-level antecedents and pays little attention to the impact of industry structure. This study investigates how different stages of an industry life cycle and industry competition affect business model innovation and how such innovation in a firm's business model translates into innovation performance. Based on a cross-industry sample of 1,242 Austrian firms, we introduce a unique measure for the degree of innovation in a firm's business model. The results indicate that the degree of business model innovation is highest towards the beginning of an industry life cycle, i.e. in the emergent stage. Competitive pressure in an industry turns out to be negatively related to the degree of business model innovation. Moreover, we find that the degree of business model innovation, conditional on having introduced a new product/process, positively influences innovation performance. Our findings provide implications for the management of business model innovation and contribute to the ongoing dialog on the role of industry structure in business model innovation.

Keywords: business model, business model innovation, industry life cycle, competition, strategy

Introduction

Business model innovation has attracted considerable attention in recent strategy literature (e.g., Baden-Fuller and Mangematin, 2013; Casadesus-Masanell and Zhu, 2013; Zott *et al.*, 2011) as well as practitioner discussion (e.g., Pohle and Chapman, 2006; Chesbrough, 2007). Understood as the “modification or introduction of a new set of key components – internally focused or externally engaging – that enable the firm to create and appropriate value” (Hartmann, Oriani, and Bateman, 2013a: 5), business model innovation has been shown to allow not only entrepreneurial but also incumbent firms to (re-)configure their way of operating and to increase performance (e.g., Desyllas and Sako, 2013; Hartmann, Oriani, and Bateman, 2013b; Massa and Tucci, 2013). The ability to develop, adjust and if necessary replace business models is considered to be central to the dynamic capabilities of a firm (Teece, 2007a). Business model innovation differs from other innovation types in that it deals with the entire activity system, not only a particular product or process (Snihur and Zott, 2013). Moreover, business model innovation is typically harder to protect against imitation compared to product and process innovation (Casadesus-Masanell and Zhu, 2013).

Despite the importance of a business model as a means for achieving competitive advantage (e.g., Teece, 2010), relatively little is known about what may lead firms to innovate components of their business model. In fact, prior research has emphasized the need for further investigation of the drivers facilitating business model innovation (Chesbrough and Rosenbloom, 2002; George and Bock, 2011; Zott and Amit, 2007). Yet existing evidence seems to be confined to firm-level antecedents, such as organizational inertia (Sosna *et al.*, 2010), inertia on the upper management level (Chesbrough and Rosenbloom, 2002; Tripsas and Gavetti, 2000a), cognitive closure of firms (Chesbrough, 2010), and conflict with existing assets (Amit and Zott, 2001). Little attention has been paid to industry structure, particularly the life cycle stage of the industry and the degree of competitive pressure. This is surprising given the seminal

contribution of Utterback and Abernathy (1975) on how the focus of innovation in products and processes changes as an industry develops over time. On the one hand, emergent industries should provide considerable potential for business model innovation. There is also evidence indicating that start-ups' early experimentation with a range of alternative business models or individual business model components may lead to a better identification of the one that can be stabilized and replicated during later phases of exploitation (Winter and Szulanski, 2001) and become profitable over the rest of the life cycle (Murray and Tripsas, 2004). On the other hand, industry maturity is one condition where existing business models may get challenged and need to be innovated (Sabatier, Craig-Kennard, and Mangematin, 2012). Following that logic, business model innovation is suggested to be most important in later stages of the industry life cycle when markets become commoditized (Johnson, 2010; Massa and Tucci, 2013).

Hence in this paper, we seek to contribute to this debate and incorporate the insights of the model proposed by Utterback and Abernathy into an analysis on how business model innovation is driven by the industry life cycle and industry competition. Specifically, as a first step we are interested in how the stage of the industry life cycle influences the degree of innovation in a firm's business model. Moreover, as a second step we move from the industry level to the firm level to investigate whether the degree of business model innovation is connected to a firm's innovation performance, defined as value capture in new product commercialization.

Our research is based on a cross-industry sample of 1,242 Austrian firms which were surveyed in 2010 in the course of the European Community Innovation Survey (CIS). We adopt the perspective of an innovating firm, i.e. one that has introduced new products or processes to the market, and focus on business model innovation that accompanies such activity. We develop a unique measure for the degree of business model innovation by applying a multi-stage expert rating process to identify CIS questions that are relevant for business model innovation, and assign them to the key

business model elements of creating, delivering and capturing value. By doing so we can go beyond investigating whether a business model has changed or not, but rather focus on the degree of business model innovation and its relationship with innovation performance. We condition on actually having introduced a new product or process in order to draw valid conclusions regarding the implications for innovation performance. Using data from structural business statistics we classify industry sectors according to their life cycle stage and compute profit persistence within industry sectors as a measure of competitive pressure.

Our results indicate that, although business model innovation is discussed as also being important in later stages of the industry life cycle, the degree of business model innovation is largest in emerging industries. Moreover, we find that contrary to what we expected industry competition negatively influences the degree of business model innovation. Finally, on the firm level we find a positive relationship between the degree of business model innovation and innovation performance while controlling for industry structure.

Our research makes at least two contributions to the literature on business model innovation. First, we complement existing research by shedding light on the industry-level antecedents of business model innovation. Adapting the model by Utterback and Abernathy (1975) we investigate how industry life cycle and industry competition motivate firms to innovate their business model and how such change translates into innovation performance. In that sense, our results provide important implications for the management of business model innovation processes. Second, most literature on business model innovation is conceptual in nature or uses single cases to illustrate findings (Schneider and Spieth, 2013). Anecdotal evidence suggests business model innovation to primarily occur when markets have become mature and commoditized (Johnson *et al.*, 2008; Massa and Tucci, 2013). We are able to leverage a large cross-

industry database to assess the relationships between industry life cycle stage, industry competition and business model innovation, which provides broad empirical evidence.

The remainder of this article is organized as follows. Section 2 provides a review of the literature on business model innovation and outlines our theoretical framework. Section 3 describes data and methods. Results are presented in section 4 and discussed in section 5. Section 6 concludes and outlines limitations of our research.

Literature Review and Hypotheses

As stated above, our conceptualization of business model innovation rests on the modification or introduction of key components through which firms aim at creating, delivering and capturing value (Hartmann *et al.*, 2013a). The definition we adopt in this paper is thus based on prior work on business models that takes an activity-based perspective (Zott and Amit, 2010), as well as on work on the constitution of the business model concept by identifying its key components (e.g. Amit and Zott, 2001; Chesbrough and Rosenbloom, 2002; Magretta, 2002; Osterwalder, Pigneur, and Tucci, 2005).

In accordance with prior literature, business models are a subject of innovation itself, expanding the traditional dimensions of product and process innovation (Massa and Tucci, 2013; Zott *et al.*, 2011; Mitchell and Coles, 2003). Business model innovation is increasingly recognized as one of the most important sources of creating competitive advantage in rapidly changing environments driven by new technologies, changes in customer preferences, and new regulations (Chesbrough, 2010; Sako, 2012; Teece, 2007b; Teece, 2010; Zott *et al.*, 2011). However, business model innovation is also considered to be a complex and risky process with highly uncertain outcome (e.g., Im and Cho, 2013; Sosna *et al.*, 2010; Chesbrough, 2010), not least because business model innovation requires experimentation (McGrath, 2010), a specific leadership agenda (Smith, Binns, and Tushman, 2010) and boundary-spanning capabilities (Zott

and Amit, 2010). Conceptualizing and formalizing the business model by carving out its key components related to creating, delivering and capturing value is discussed as a way to structure, simplify and thus alleviate the process of business model innovation (e.g., Massa and Tucci, 2013; Johnson et al. 2008).

But what drives or blocks business model innovation? While existing research mainly focuses on firm-level antecedents (e.g., Sosna *et al.*, 2010; Chesbrough, 2010; Amit and Zott, 2001; Tripsas and Gavetti, 2000a) looking into specific contexts indicates a number of additional sources of business model innovation. In the course of servitization initiatives, for example, it has been shown that firms' business models change when they are traversing through a servitization life cycle (Neely, 2008; Visnjic Kastalli and Van Looy, 2013; Visnjic Kastalli, Van Looy, and Neely, 2013). Further drivers of business model innovation include market changes, new technology, shifting demographics, or greater regulatory oversight (Baden-Fuller and Haefliger, 2013; Drucker, 1984). In the case of new technology, the role of the business model has been described as mediating between technological innovation and firm performance (Baden-Fuller and Haefliger, 2013). The same technology commercialized in different ways may result in different economic outcomes (Chesbrough, 2010). In this sense, business models are indeed a subject of innovation in itself allowing firms to compete through their business models (Casadesus-Masanell and Zhu, 2013).

Little research is however available that focuses on the industry level, i.e., on the role of industry structure for business model innovation. While a mature industry has been reported to provide a context where existing business models may get challenged and need to be innovated (Sabatier, Craig-Kennard and Mangematin, 2012), a systematic treatment of how industry life cycles and industry competition affect business model innovation – analog to the model by Utterback and Abernathy (1975) for product and process innovation – is absent from the literature. In their model, Utterback and Abernathy (1975) distinguish between three stages. In the “fluid phase”,

firms are primarily concerned with product innovation in order to find out which design appeals most to customers and fulfills their requirements. Over time a dominant design emerges that captures the majority of the market, which is suggested to be in a “transition phase” towards product standardization and an increasingly efficient production. In this phase, process innovation becomes the dominant focus of firms until, in the “specific phase”, the focus lies on cost minimization with decreasing importance of both product and process innovation.

In the following, we will first present arguments regarding the industry-level antecedents of business model innovation before we outline the firm-level implications of business model innovation for innovation performance.

INDUSTRY-LEVEL ANTECEDENTS OF BUSINESS MODEL INNOVATION

Prior literature on business model innovation has focused on how incumbents rethink their own business models after a new venture enters their market with a disruptive business model (e.g., Casadesus-Masanell and Zhu, 2013). Incumbents may be forced to adapt to the altered competitive environment and react with business model innovation (Johnson, 2010; Massa and Tucci, 2013; McGrath, 2010; Teece, 2010). However, changing fundamental components of a running business is risky (Girotra and Netessine, 2011). Hence, knowing when to innovate a business model is a critical challenge for managers (Johnson, 2010). The model by Utterback and Abernathy (1975) provides an understanding of how the focus of innovation changes as an industry develops. When an industry matures, it becomes increasingly difficult for firms to differentiate themselves on the basis of products and production processes (Johnson, 2010; Utterback, 1994).

As a consequence, prior work suggests that there is a succession from product to process, and finally to business model innovation (Massa and Tucci, 2013; Boutellier, Eurich, and Hurschler, 2010). Servitization life cycles, for example, often pass through three phases: (1) in the transactional phase the business model is defined by single

payments for physical products; (2) in the interactional phase the business model includes considerations about value creation based on adding services to the tangible good with revenue generation typically relying on pay per use; (3) in the relational phase service provisioning becomes truly outcome-based and the manufacturer understands itself as a result provider (Visnjic Kastalli *et al.*, 2013; Martinez *et al.*, 2011). A study in the truck industry shows that the life cycle of the service offering transforms over time from selling an artefact (truck) to selling mobility (miles driven) (Martinez *et al.*, 2011). The study also demonstrates that the degree of servitization can be too ambitious in the first place because customers may not be mature enough to receive the service (Martinez *et al.*, 2011). Services are context specific (Visnjic Kastalli *et al.*, 2013) and servitization life cycles are thus difficult to generalize and predict. However, the anecdotal evidence available suggests that business model innovation becomes more intense under real or anticipated competitive pressure, when profit margins are declining and rather towards the end of an industry life cycle (Eggert *et al.*, 2014; Neely, 2008; Visnjic Kastalli *et al.*, 2013).

It seems that firms tend to put much effort into business model innovation when they experience that their once successful business model loses ground and revenues are dropping. Business model innovation offers a way to differentiate from competitors in a situation when differentiation is not possible based on product or process innovation (Chesbrough, 2010; Johnson, 2010; Matzler *et al.*, 2013). Sabatier and Mangematin (2012) find empirical evidence that when an industry is mature and profitability is decreasing, existing business models are likely to be challenged by new business models. In his seminal work on disruptive innovation, Christensen demonstrated that disruptors enter mature industries primarily with the help of rule-breaking business models (Christensen, 2006; Christensen, 1997b).

Nevertheless, there may also be considerable opportunities to innovate the business model in emergent industries which are dominated by start-up firms. Start-ups

have been shown to frequently experiment with a range of alternative business models or individual business model components in order to better identify the one that can be stabilized and replicated during later phases of exploitation (Winter and Szulanski, 2001; Murray and Tripsas, 2004). They have the choice to tinker around with different business model components and realize new business opportunities. Business model innovation often flourishes especially when innovative technologies are applied and monetized in different ways (Chesbrough, 2010). Taking the arguments together, our first hypothesis reads:

Hypothesis 1: The degree of business model innovation is highest towards the beginning and the end of an industry life cycle, i.e. in the emergent and the decline stage.

Since the life cycle an industry passes through is strongly connected to the entry and exit of firms – i.e. there will be high entry in the emergent and high exit of firms in the decline stage (McGahan and Silverman, 2001) – the degree of business model innovation has been argued to depend on real or anticipated competitive pressure and associated profit margins (Eggert *et al.*, 2014; Neely, 2008; Visnjic Kastalli *et al.*, 2013). In the Schumpeterian view, where innovation is driven by the expectation of higher profits through temporary monopolies, an increase in competition, which lowers profits, will reduce innovation. However, the results of past studies on competition and innovation have been mixed. While some studies describe a negative relationship (e.g., Aghion and Howitt, 1990; Hashmi, 2013) others find a positive relationship between competition and innovation (e.g., Carlin, Schaffer, and Seabright, 2004; Gorodnichenko, Svejnar, and Terrell, 2010; Nickell, 1996). In a seminal article, Aghion *et al.* (2005) derive an inverse U-shaped relationship between competition and innovation: some competitive pressure motivates firms to innovate and introduce new

products in order to achieve a temporary monopoly but after a certain point when competitive pressure becomes too high incentives to innovate decrease because firms may no longer be able to yield a return from their investments into innovation. Prior contrary results seem to depend on the time period, the definitions of competition and innovation used, and market characteristics (Gilbert, 2006; Hashmi, 2013; Tang, 2006).

While such an inverse U-shaped relationship seems sensible in the context of product innovation, we will suggest in the following that there is a positive relationship between competitive pressure and the degree of business model innovation. Previous studies have highlighted competitive pressure and the struggle for survival as important drivers of business model innovation, specifically in incumbent firms (Aspara *et al.*, 2013; Sosna *et al.*, 2010). It may appear too risky to thoroughly innovate a firm's business model, however, decision makers' willingness to do so increases with competitive pressure. In fact, anecdotal evidence suggests that most cases of a successful business model innovation either occurred by new entrants on the market or by incumbent firms that experienced severe business problems (Chesbrough, 2007, 2010; Drucker, 1995; Lindgardt, Reeves, and Stalk, 2009). In the context of servitization, prior research argues that the inflection point when a firm's focus shifts from products to services is often based on current or anticipated future competitive pressure (Suarez, Cusumano, and Kahl, 2012; Cusumano, Kahl, and Suarez, 2014). It seems unlikely that competitive pressure will, along the lines of an inverse U-shaped relationship, after a certain point decrease the degree of business model innovation since firms resisting business model innovation are likely to be outcompeted by their competitors over time. Hence, we propose:

Hypothesis 2: There is positive relationship between competitive pressure in an industry and the degree of change in business models.

FIRM-LEVEL PERFORMANCE CONSEQUENCES OF BUSINESS MODEL INNOVATION

The link between business models and firm performance is among the dominant themes in prior business model literature (Lambert and Davidson, 2013). In general, most of the evidence available on the matter is drawn from case study research. An exception here are Casadesus-Masanell and Zhu (2013) with a formal model of business model innovation for a specific type of business models, namely sponsor-based business models, with a focus on the competitive imitation of business models. Hartmann and colleagues developed a quantitative model for business model innovation, using the NK-modelling approach, which focuses on the antecedents and performance implications of business model innovation in incumbent firms within established industries (Hartmann *et al.*, 2013a, 2013b).

In the following, we will outline the mechanisms underlying the relationship between business model innovation and performance. Specifically, we are interested in the implications for innovation performance given that a firm has introduced a (technologically) new product or process. In that sense, we follow prior literature which argues that the full potential of new technologies can often only be realized with innovation in the firm's business model (Baden-Fuller and Haefliger, 2013; Chesbrough and Rosenbloom, 2002). Consistent with the value capture objective of a business model, we adopt the strategy definition of innovation performance, i.e. the value a firm can appropriate from its innovations (e.g., Laursen and Salter, 2006a).

Rather than innovating the business model or not, such innovation may be incremental, defined in our context as involving only a few components (Massa and Tucci, 2013). Firms innovating a small number of business model components may only adapt their existing business model to changing markets. If a business model is sufficiently differentiated and hard to replicate, for incumbents and new entrants alike, it may lead to a head-start over competitors (Teece, 2010). Changing a larger number of components of the business model, i.e. more radical business model innovation, may

increase firm specificity which retards imitation by competitors and thus secures a higher degree of appropriability of the firm's innovations (Helfat, 1994).

Furthermore, firms introducing a new product which is supported by a high degree of business model innovation may realize a truly innovative value proposition that in turn allows benefiting from first mover advantages (Lieberman and Montgomery, 1988): In this case the value capture in new product commercialization, i.e. innovation performance, is high. As the first one with a novel value proposition, a company may have the opportunity to create a lock-in with the customers, e.g. in terms of creating positive network externalities (Katz and Shapiro, 1985), achieving commitment to a contract, personalization of products or services, or by inducing switching costs (Amit and Zott, 2001; Frank, 2007; Harrison et al., 2012; Lieberman and Montgomery, 1988). Lock-in is considered a means to bind consumers to the business, create a market for cross-selling opportunities, and eventually gain recurring revenues from the same pool of customers (Amit and Zott, 2001; Farrell and Klemperer, 2007). Therefore, the turnover achieved with new products or services, i.e., innovation performance can be assumed to be high. Thus, our third hypothesis reads:

Hypothesis 3: There is a positive relationship between the degree of business model innovation, conditional on having introduced a new product or process, and the innovation performance of a firm.

Methods

DATA

The empirical analyses of our study are based on two data sources. First, we draw data from the Austrian Structural Business Statistics (SBS), a database that provides indicators concerning the structure, employment, activities and performance of Austrian firms in the breakdown by economic activities. From the SBS data, we

specifically use the number of firms active in three-digit level NACE industries over the period from 2005 to 2011 to classify industries according to their stage in the industry life cycle. Second, we draw data from the Austrian part of the European Union's Community Innovation Survey (CIS) 2010. The methodology and questionnaire used follow the Oslo manual of the OECD (OECD, 2005). The survey is directed at decision makers for a firm's innovation activities such as CEOs, heads of innovation management units or R&D departments. Informants provide direct, importance-weighted measures for several questions on innovation inputs, processes and outputs (Criscuolo, Haskel, and Slaughter, 2005). The surveys have been used in European Union member and associated states for more than a decade. To ensure interpretability, reliability and validity they are subject to extensive pre-testing and piloting in various countries, industries and firms (Laursen and Salter, 2006a). CIS data have often been used in recent contributions in the strategy and innovation literature (e.g., Laursen and Salter, 2006a; Grimpe and Kaiser, 2010; Leiponen and Helfat, 2011).

The Austrian CIS data consist of a representative random sample of incumbent and emergent firms with at least ten employees from the following sectors: mining, manufacturing, energy, water supply, trade, transport, information and communication services, financial intermediation, and professional, scientific and technical service activities. The 2010 survey was sent out to 5409 firms, of which 3172 provided reliable information, which results in a response rate of 59.3 percent (StatisticsAustria, 2012). For the 2010 survey, data refer to the three-year period from 2008 to 2010.

As outlined before, we restrict attention to innovation-active firms in the sample. Innovation-active firms are firms that either had at least one product and/or process innovation, or have not finished yet or failed with product and/or process innovation during the observation period. Restricting the sample to innovation-active firms allows us to identify performance differences for firms that engage in business model innovation in addition to product/process innovation activities as compared to firms

whose innovation activities are limited to products and processes. Due to limited numbers of observations in some industry groups we omitted two groups (agriculture and mining) and combined others (information and communication services and financial intermediation). Our effective sample, without missing values, consists of 1,242 observations. Prior studies based on CIS-type data indicate the restriction to innovative firms to be unproblematic in terms of selection bias (Grimpe and Kaiser, 2010). Since the Austrian micro-level CIS data are not publicly available, R-scripts were written for execution by Statistics Austria, which in turn provided us with the data analysis results.

MEASUREMENT OF THE DEPENDENT VARIABLES

Degree of business model innovation

Although the CIS provides a broad range of information on innovation activities, firms are not directly asked about business model innovation. Since the CIS survey in 2010, innovation activities have been split up into four different types, as suggested by the OECD (2005): product innovation, process innovation, marketing innovation, and organizational innovation. The measure for the degree of business model innovation was thus developed by applying a multi-stage expert rating process in which three independent experts were asked to identify CIS questions relevant for business model innovation and to map them to the key elements of creating, delivering and capturing value. More specifically, we first inspected the entire set of 58 CIS questions and removed those without potential to indicate business model innovation prior to the expert rating process. In total, we removed 16 sub-questions related to two question blocks on employee skills and employee education, as well as on the type of cooperation partners in this preparatory stage. Questions related to cooperation partners furthermore only had to be answered subject to whether or not the firm actually cooperated with other firms and were thus not answered by all firms in the sample.

Second, we selected three independent external experts in business model innovation¹ and individually asked them to rate the remaining 42 questions on whether an answer to these questions may indicate if a firm innovated its business model, i.e. the way it creates, delivers and/or captures value. In line with a procedure for expert rating outlined by Krippendorff (2004), all experts were provided with the business model definition outlined above and informed about the evaluation criteria and the respective rating scales prior to starting the rating process. The aim of this step was to ensure that all experts had a comparable understanding of the task and of the rating standards to be applied. Whether or not an answer to a CIS question contains information on business model innovation was measured using a 5-point rating scale (where 1 = contains no information on business model innovation at all and 5 = contains a high level of information on business model innovation).

In a third step, we informed every expert about the individual ratings of the respective other two experts. Based on this, the experts were allowed – but not required – to individually adapt and refine their ratings if the other experts' ratings convinced them to change their assessment. Interrater reliability was assessed by calculating Krippendorff's alpha. Krippendorff's alpha is a conservative index that measures agreement among multiple raters and is considered a highly rigorous measure for assessing interrater reliability for rating scales such as those employed in this study (values of .67 and greater are generally considered to be satisfactory; Krippendorff 2004). The agreement coefficient for our study is 0.84 and thus well above the recommended threshold value.

For further analysis we constructed three versions of the variable representing the degree of business model innovation based on three different thresholds on the 5-point rating scales (>3.0 , >3.5 , >4.0), i.e. we selected those CIS questions that received

¹ All three experts have international publications on business model innovation and/or other business model-related topics as well as practical experience in developing business models or consulting business model innovation processes.

expert ratings above 3.0, 3.5 or 4.0. These variables include, depending on the threshold, eighteen, eleven, or seven of the initial 58 CIS questions². The different thresholds represent more and less inclusive views of the business model construct. The most rigorous selection (threshold value >4.0), for example, resulted in the selection of the following seven CIS items: (1) “Were any of your product innovations (goods or services) during the three years 2008 to 2010 new to your market?”, (2) “Were any of your product innovations during the three years 2008 to 2010 a first in Austria, Europe or a world first?”, (3) “During the three years 2008 to 2010, did your enterprise introduce new or significantly improved logistics, delivery or distribution methods for your inputs, goods or services?”, (4) “During the three years 2008 to 2010, did your enterprise introduce new business practices for organizing procedures (i.e. supply chain management, business re-engineering, knowledge management, lean production, quality management, etc.)?”, (5) “During the three years 2008 to 2010, 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.)?”, (6) “During the three years 2008 to 2010, 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.)?”, and (7) “During the three years 2008 to 2010, did your enterprise introduce new methods of pricing goods or services (i.e. first time use of variable pricing by demand, discount systems, etc.)?”. Data analysis was done using all three versions of the degree of business model innovation variable to provide respective robustness checks.

² Table A5 in the appendix provides the list of selected CIS questions for all three threshold values. Table A6 additionally informs about how business model innovation-relevant CIS questions were assigned to creating, delivering and capturing value for the eighteen-item selection.

Innovation performance

We follow prior innovation studies and refer to the market acceptance of a firm's innovations by using the share of sales achieved with new products (irrespective of whether they were new to the market or only the firm) as our measure for innovation performance as reported in the CIS (e.g., Grimpe and Kaiser, 2010; Klingebiel and Rammer, 2014).

MEASUREMENT OF THE INDEPENDENT VARIABLES

Industry life cycle stage classification

Following prior work related to industry life cycles, we classify industries into three life cycle stages: emergent (stage I), maturity (stage II), and decline (stage III) (e.g. Dinlersoz and MacDonald, 2009; Klepper and Graddy, 1990; Utterback and Abernathy, 1975). We apply an approach taken by McGahan and Silverman (2001) to identify the inflection points that characterize the beginning and end of industry life cycle stages by analyzing the number of active firms in industries over time. In this approach the point of industry maturity is detected when the growth rate in the number of firms starts slowing down. Industries move into stage III when the absolute number of firms starts declining. In more detail, life cycle stage II is defined as “the first year in which the number of firms grows during a 3-year period at less than 3% of the growth rate in the prior 3-year period” (McGahan and Silverman, 2001, p. 1144). Life cycle stage III is defined as “the first year in which the number of firms during a 3-year period is less than 97% of the number in the prior 3-year period” (McGahan and Silverman, 2001, p. 1144). We imposed an additional criterion that industries are only classified as being in stage I if the growth rate is strictly positive over the analyzed period. Otherwise, stable industries that contain only very few firms, such as fishing in Austria, would be classified as emergent. To avoid short-term fluctuations, three-year rolling averages are used in all algorithms. We applied this approach since data on gross entry and gross exit rates was not available for this kind of analysis. Otherwise, the

classification mechanisms similar to the one reported in Klepper and Graddy (1990) might be preferable. Industries that did not show one of the patterns for the three stages were not used in the analysis, which was the case for five out of 68 three-digit-level NACE codes.

Industry competition

Since profitability or rents are a standard proxy for competition in the empirical innovation literature (e.g., Greenhalgh and Rogers, 2006) we measured sector-based competitive pressure with profitability. Following Aghion et al. (2005) we specifically apply the ratio of net profit to total sales for three-digit-level NACE codes. Other measures such as market share or concentration indices rely more directly on precise definitions of geographic and product markets. This, however, would not be applicable in our study since many Austrian firms highly depend on foreign markets and thus market concentration measures on the basis of Austrian data may be misleading (Aghion *et al.*, 2005). Due to data confidentiality reasons, information on profitability was not available for individual firms and we therefore computed the competition measure using average values for industry sectors.

Control variables

We control for innovation inputs by using the *innovation intensity* measured as innovation expenditures as a share of sales to account for different levels of innovation investments. To control for different technological preconditions concerning business model innovation we include a dummy variable to account for all industries with an above-average *patenting propensity* as measured by Cohen et al. (2000). We furthermore use the number of *employees* in logarithm to account for firm size. Since existing studies often connect business model innovation to the advent of the internet (Amit and Zott, 2001) and postindustrial technologies such as software (Perkmann and Spicer, 2010) we also include a dummy variable that considers whether or not a firm employed *software developers* in-house. Whether firms are engaged in *cooperations* in

any innovation activities with other enterprises or institutions is taken into account as well because business model innovation is a boundary-spanning activity in which partners may take a crucial role. Moreover, we control for variation in business model innovation and innovation performance that may be caused by whether or not a firm belongs to a group of companies (*enterprise group*). Finally, we include a set of dummies to account for different geographic markets the firm sells its goods and/or services to (*local, national, European, other markets*) and apply 15 industry dummy variables representing industry groups as defined in the classification of the OECD (2006).

Model

To assess the sensitivity of our results to differences in measurement of the degree of business model innovation, we present all results for the three different versions of the degree of business model innovation variable. Version (a) of the degree of business model innovation variable takes eighteen, version (b) eleven, and version (c) seven different questions into account. Models with such count measures as dependent variable are commonly modeled with a Poisson estimator. However, a test for overdispersion indicates that the assumption of a Poisson distribution is violated. To correct for overdispersion, we employ negative binomial models to investigate the relationship of the industry life cycle stages and competitive pressure with the degree of business model innovation. As a robustness check we also present findings from Poisson regression models in Appendix A1.

We estimate the models on the relationship between the degree of business model innovation and innovation performance using a tobit regression model, since the dependent variable is censored between 0 and 100 and has several observations clustered at zero. Moreover, the degree of business model innovation is an endogenous variable which may bias the estimation results if endogeneity remains unaccounted for.

As a consequence, we follow the methodology of Rivers and Vuong (1988) to account for potential endogeneity of the degree of business model innovation in the tobit models as a consistency check for our results. This requires an instrumental variable which should be correlated with the endogenous variable, i.e. the degree of business model innovation, but uncorrelated with the dependent variable, i.e. innovation performance. Unfortunately, the Austrian CIS data do not contain potential instruments, such as information on hampering factors or innovation subsidies. We therefore had to revert to the three-digit NACE industry mean value of the degree of business model innovation variable. Theoretically, it is sensible to assume the industry mean to be related to the firm-specific variable but unrelated to firm innovation performance. In fact, the correlation between the mean and the endogenous variable is quite high 0.38/0.36/0.37 (subject to the respective degree of change variable) while it is quite low between the mean and innovation performance 0.16/0.17/0.16. The F-statistic from the weak instruments test does not indicate the instrument to be weak but since we only have one instrument we cannot perform an overidentification test. Although we acknowledge that our choice of instrument is not optimal, we are bound by the availability of data in the Austrian CIS. Rivers and Vuong (1988) describe a two-stage model. In the first stage, the degree of business model innovation is regressed on the instrument and exogenous regressors. The fitted values and residuals from this first stage are then both included in the tobit model estimated in the second stage. We will refer to the estimates from this process as IV-tobit estimates.

Finally, as outlined above, our analyses are based on the sample of innovating firms, i.e. those that have introduced new products or processes. Innovative firms in that sense have made an initial decision whether to innovate or not while other firms are probably not innovative due to path dependency. Within the group of product/process innovators, innovation activities are however very permeable in the sense that many product innovators also perform process innovation and vice versa, if not at the same

time then probably in the short run (Grimpe and Kaiser, 2010). Focusing only on product innovators would thus introduce a selection bias. Nevertheless, we also show a consistency check for the sample of product innovators only which yields consistent results.

Results

Table 1 presents descriptive statistics. It turns out that, on average, firms answered 7.82/4.37/2.42 (subject to the respective degree of business model innovation variable) business model relevant questions from the CIS questionnaire with yes. Firms in the sample achieve on average 9.18 percent of their sales with new products. Moreover, 21 percent of firms in the sample are classified as being in lifecycle stage II, 55 percent in lifecycle stage III; leaving 24 percent of the firms classified as being in lifecycle stage I. A mean of 0.89 in competition indicates that on average there is some degree of market power. A value of 1 would indicate perfect competition.

Table 2 presents the pairwise correlations for all measures. All three versions (a), (b) and (c) of the degree of business model innovation variable correlate highly with each other and positively with innovation performance. There are no indications for collinearity problems in our data as evidenced by the rather low mean variance inflation factors of 1.93 in the models predicting the degree of business model innovation and 1.95 in the innovation performance models (Belsley, Kuh, and Welsh, 1980).

Insert Table 1 about here

Insert Table 2 about here

Models 1-3 in Table 3 present the negative binomial results predicting the degree of business model innovation. In all three models the dummy variables for the industry life cycle stages I are positive and significant against the base category life cycle stage II (M1: $\beta=0.131$, $p<0.01$; M2: $\beta=0.147$, $p<0.01$; M3: $\beta=0.216$, $p<0.01$). The coefficients for life cycle stage 1 are all significantly different from the coefficients for life cycle stage III (M1: $p<0.001$, M2: $p<0.01$, M3: $p<0.05$) based on a Wald test. The coefficients for life cycle stage III are however not significantly different zero in any of the models. This indicates that in emergent industries firms exhibit a higher degree of business model innovation than in later industry life cycle stages. Consequently, Hypothesis 1, which predicted a higher degree of business model innovation to occur in early and late stages of the industry life cycle, has to be qualified. It turns out that most change occurs in the emergent stage but considerably less in the decline stage.

Competition has a significant negative relationship (M1: $\beta=-0.893$, $p<0.01$; M2: $\beta=-0.922$, $p<0.01$; M3: $\beta=-1.116$, $p<0.01$) with the degree of business model innovation. As a result, we need to reject Hypothesis 2, which argued for a positive relationship between competitive pressure in an industry and the degree of business model innovation. Among the control variables innovation intensity, firm size as measured by the number of employees (in log), having software development, being part of an enterprise group and being engaged in innovation cooperation have a positive relationship with the degree of business model innovation. Results for the industry dummies are included in Table A1.

Models 4-6 investigate the relationship of the degree of business model innovation with innovation performance on the firm level, again, using three different versions of the degree of business model innovation variable. It turns out that the degree of business model innovation is positive and significant (M4: $\beta=3.458$, $p<0.001$; M5: $\beta=6.154$, $p<0.001$; M6: $\beta=9.069$, $p<0.001$). This finding provides support for Hypothesis 3.

The coefficients for the industry life cycle stages do not show any significant relationship with innovation performance. Among the control variables innovation intensity, selling products in national, European or other markets, and cooperation have a positive association with innovation performance. In-house software development and the number of employees relate negatively to innovation performance.

Insert Table 3 about here

Tables A2 to A4 in the appendix show our consistency checks. We find consistent results when the IV-Tobit regression is used in which the degree of business model innovation is instrumented. Moreover, results are consistent for the sample of product innovators only.

Discussion

How does industry structure affect business model innovation and how does such innovation in the business model translate into innovation performance of a firm? Our results indicate that in fact industry structure has an important role to play in affecting business models. We find significant associations between the industry life cycle stages, competitive pressure and a firm's degree of business model innovation. We also find a positive association between the degree of business model innovation and a firm's innovation performance. As discussed below, our findings shed light on the role of industry structure in business model innovation and have implications for the management of innovation projects.

Firstly, our research focused on the industry level and suggested business model innovation to be seen in the context of the model by Utterback and Abernathy (1975). In that sense, we argued business model innovation to mainly occur both at the beginning and towards the end of an industry life cycle. In fact, we find most business model

innovation to occur in the emergent life cycle stage, which suggests that firms are experimenting with different configurations of their business model until it becomes stable and is exploited over time. Few changes apparently happen both in the maturity and decline stage. Although a maturing industry should provide lower opportunities for firms to differentiate themselves based on product or process innovation, we cannot substantiate a higher degree of business model innovation instead. In that sense, our findings challenge prior research that finds business model innovation to be most important in later stages of the industry life cycle when markets become commoditized (Johnson, 2010; Sabatier *et al.*, 2012; Massa and Tucci, 2013). Potential explanations for this reluctance to innovate the business model are higher risk (e.g., losing existing customers), higher barriers to business model innovation in later industry stages, such as organizational inertia (Sosna *et al.*, 2010), and managing conflicts with existing business models (Christensen, 2006; Chesbrough, 2010). Considering the relatedness of product, process and business model innovation in our measurement, this leads us to qualifying our reasoning regarding the inclusion of business model innovation as a third dimension to Utterback and Abernathy's model of changing rates of product- and process innovation. This finding reflects our conceptualization of business model innovation as relying, among other components, on product and process innovation. Nevertheless, we substantiate the notion by Utterback (1994) who describes the initial "fluid phase" as one in which a lot of change occurs and in which outcomes are highly uncertain, not just in terms of products and processes, but also in the competitive leadership, the structure and management of firms (Utterback, 1994).

Secondly, and still on the industry level, we argued for a positive relationship between competitive pressure in an industry and the degree of business model innovation. Business model innovation could offer a faster way to cope with intense competition compared to product innovation based on creating a temporary monopoly that would allow firms to escape price competition. Instead, we find evidence of a

negative relationship. It seems that competitive pressure rather discourages business model innovation. Firms become reluctant to experiment with a range of alternative business models or individual business model components because they may fear being driven out of the market all too quickly if certain changes in the business model do not turn out to be viable. Another explanation refers to the strength of intellectual property protection which affects incentives to invest in innovation (Gilbert, 2006). Business model innovation is typically harder to protect against imitation compared to product and process innovation (Casadesus-Masanell and Zhu, 2013).

Thirdly, our research moves on the firm level and introduces the industry structure into an estimation of the relationship between the degree of business model innovation and innovation performance (e.g., Hartmann *et al.*, 2013b; Pohle and Chapman, 2006; Sánchez and Ricart, 2010; Zott and Amit, 2007), given that a firm has introduced a product or process innovation. Our findings provide support for the hypothesis that there is a positive relationship while controlling for industry structure. Apparently, innovating more components of the business model increases firm specificity which retards imitation by competitors and thus secures a higher degree of appropriability of the firm's innovations (Helfat, 1994).

Besides the three hypothesized relationships, it is interesting to note the relationship between firm size and the degree of business model innovation and innovation performance, respectively. Our results indicate a positive relationship in the former case, demonstrating that larger firms do have a higher inclination to innovate their business model. In that regard, we extend prior literature by not limiting the analysis to start-up firms which typically face a higher likelihood of innovating their business model (Winter and Szulanski, 2001). Instead our analysis includes large, medium and small-sized firms, indicating business model innovation to be more likely to occur in larger firms. Furthermore, our results show a negative relationship of firm

size with innovation performance. Potential explanations include organizational inertia and higher levels of bureaucracy with increasing size.

Our results have implications both for the academic literature on business model innovation as well as for practitioner discussion. First, we extend prior literature by focusing on the role played by industry structure. We incorporate the insights of the model proposed by Utterback and Abernathy (1975) into an analysis on how business model innovation is driven by the industry life cycle and industry competition. In that sense, we complement existing research by shedding light on the industry-level antecedents, which we find to be important predictors of business model innovation. An analysis of the drivers of business model innovation without considering the industry-level would thus be incomplete and potentially biased.

Second, our approach shows how innovation survey data may be fruitfully applied towards the identification of business model innovation. By applying a multi-stage expert rating process to identify survey questions that are relevant for business model innovation, we develop a unique measure for the degree of innovation in a firm's business model that can easily be adopted and replicated by scholars working with innovation survey data such as the CIS. Applying the measure to CIS data, however, requires careful consideration of the (slight) differences in the implementation of the survey across European countries and across time. We believe that adding a question regarding changes in the basic "units of business" (c.f. McGrath, 2010) to innovation surveys could help to improve the identification and analysis of business models in innovation survey data. In that sense, our research also allows going beyond single cases to illustrate findings (Schneider and Spieth, 2013) and thus provides a broad coverage of industries. Moreover, our measure of business model innovation based on CIS data offers three different conceptualizations, and thus allows for future experimentation with more or less conservative measurements and their effects.

Third, our research provides implications for the management of innovation projects. Business model innovation that accompanies the introduction of new products and processes positively influences innovation performance. If a new technology changes the way value is created and delivered to consumers, a new business model can strengthen the capabilities to capture some of the value created. While our approach does not allow to identify the concrete components of the business model that should be innovated in connection with product or process innovation, our results encourage managers to not only focus on developing new technology. They may additionally place considerable emphasis on potential avenues for improving the business model to fully exploit the potential of product and process innovation.

Conclusions

Our research is one of the first attempts to consider the role of industry structure on business model innovation and thus hopefully will inspire future discussions on drivers of business model innovation beyond the firm level. Eventually it may contribute to developing a better understanding of when - along an industry's life cycle – it is most beneficial for firms to consider innovating their business model.

However, our study clearly also has some limitations that we need to acknowledge. First of all, these limitations concern the empirical approach to testing our hypotheses. The changing rates of business model innovation over the industry life cycle should ideally be measured using longitudinal data derived over a number of years in a single industry. This would also allow to investigate whether firms prefer to exhaust options for – allegedly – lower risk product or process innovation before they move on to innovate the business model. Furthermore, our variable for measuring the degree of innovation in a business model does not incorporate interdependencies between the different components of the business model. For example, one could assume process innovation to necessarily occur in connection with changes in the organizational

structure. The method presented herein is an approximation for the complexities involved in business model innovation efforts of a firm.

What is more, patterns of business models may vary across the industry life cycle. Our setup, however, only allows us to look into the relationship between a specific life cycle stage and the degree of business model innovation. We cannot identify certain communalities of business models depending on the life cycle stage. Incumbent firms are oftentimes characterized by a high stability of their business model over time. In fact, they may stick to their business model even though the industry is declining due to organizational inertia, lock-in effects, and path dependency (Cavalcante, Kesting, and Ulhøi, 2011; McGrath, 2010; Sosna *et al.*, 2010). Hence, there is reason to assume a certain stability of the business model over time, even though we find evidence of some degree of business model innovation. Finally, radical business model innovation often happens across industry boundaries, an aspect that is not captured in the traditional classification of economic activity. Additional empirical analyses using different measures for business model innovation and alternative methods for classifying industry life cycles could therefore help to validate our findings.

Overall, the results of this study indicate that industry structure plays a significant role in business model innovation. Taking the industry life cycle stage and competitive pressure into consideration may enable managers to develop a richer understanding of the performance impact of their business model innovation endeavors. We hope that this study may also serve as a step towards more empirical work on the topic. While the present study measured the performance consequences of different degrees of business model innovation, it did not investigate the consequences of particular types or patterns of business model innovation, i.e., configurations of business model components. Future studies could investigate in more depth how particular patterns of business model innovation perform throughout the industry life cycle. One could also investigate in more detail the relationship between the different types of

innovation, especially the interdependencies between technological innovations and business models. Future research could furthermore clarify the performance implications of business model innovation both in terms of other measures of performance and in the long term, as radical business model innovation may have a detrimental effect in the short run, but generate positive returns in the long run.

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Tables

Table 1. Descriptive statistics (n=1,242)

	Mean	Std. dev.	Min	Max
Degree of BMI (a)	7.82	4.00	0	18
Degree of BMI (b)	4.37	2.50	0	11
Degree of BMI (c)	2.42	1.75	0	7
Innovation performance	9.18	17.56	0	100
Life cycle stage II	0.21	0.41	0	1
Life cycle stage III	0.55	0.5	0	1
Competition	0.89	0.05	0.52	1
Patenting propensity	0.26	0.44	0	1
Innovation intensity	0.04	0.11	0	1
National market	0.37	0.48	0	1
European market	0.33	0.47	0	1
Other market	0.08	0.26	0	1
Employees (log)	4.41	1.41	2.3	9.66
Software development	0.71	0.46	0	1
Enterprise group	0.64	0.48	0	1
Cooperation	0.57	0.5	0	1

(a) Selection of CIS questions on the basis of threshold value >3.0 (18 questions)

(b) Selection of CIS questions on the basis of threshold value >3.5 (11 questions)

(c) Selection of CIS questions on the basis of threshold value >4.0 (7 questions)

Table 2. Correlations (n=1,242)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
(1) Degree of BMI (a)															
(2) Degree of BMI (b)	0.95***														
(3) Degree of BMI (c)	0.88***	0.93***													
(4) Innovation performance	0.29***	0.33***	0.34***												
(5) Life cycle stage II	-0.03	-0.03	-0.05	-0.01											
(6) Life cycle stage III	0.02	0.02	0.03	0.01	-0.57***										
(7) Competition	-0.10***	-0.07*	-0.03	-0.08**	0.06*	0.22***									
(8) Patenting propensity	0.07*	0.06*	0.02	0.03	0.02	0.06*	-0.06*								
(9) Innovation intensity	0.14***	0.12***	0.09***	0.23***	-0.03	0.04	-0.12***	0.10***							
(10) National market	-0.05	-0.04	-0.01	-0.03	0.00	-0.01	0.09**	-0.17***	-0.06						
(11) European market	0.15***	0.13***	0.10***	0.10***	0.02	0.06*	0.00	0.21***	0.09**	-0.54***					
(12) Other market	0.09**	0.08**	0.08**	0.07*	0.00	0.06*	0.00	0.16***	0.05	-0.22***	-0.20***				
(13) Employees (log)	0.36***	0.31***	0.27***	-0.06*	0.03	0.01	-0.03	0.16***	-0.10***	-0.09**	0.20***	0.11***			
(14) Software development	0.27***	0.24***	0.22***	0.05	0.02	-0.01	-0.08**	-0.05	0.07*	0.01	0.05	0.03	0.20***		
(15) Enterprise group	0.25***	0.24***	0.24***	0.01	0.07**	-0.02	0.04	0.07*	-0.06*	-0.07*	0.17***	0.09**	0.48***	0.10***	
(16) Cooperation	0.47***	0.37***	0.36***	0.17***	0.02	-0.03	-0.08**	0.08**	0.08**	-0.08**	0.17***	0.09**	0.31***	0.14***	0.25***

*** p<0.001, ** p<0.01, * p<0.05

(a) Selection of CIS questions on the basis of threshold value >3.0 (18 questions)

(b) Selection of CIS questions on the basis of threshold value >3.5 (11 questions)

(c) Selection of CIS questions on the basis of threshold value >4.0 (7 questions)

Table 3. Negative binomial and tobit regression estimates

	Degree of business model innovation			Innovation performance		
	Negative binomial			Tobit		
	Model 1 ^a	Model 2 ^b	Model 3 ^c	Model 4 ^a	Model 5 ^b	Model 6 ^c
Degree of BMI				3.458*** (0.277)	6.154*** (0.409)	9.069*** (0.579)
Life-cycle stage I	0.131** (0.044)	0.147** (0.052)	0.216** (0.069)	0.761 (3.169)	0.323 (3.094)	-0.575 (3.087)
Life-cycle stage III	0.018 (0.034)	0.027 (0.039)	0.072 (0.052)	0.241 (2.356)	-0.01 (2.300)	-0.888 (2.291)
Competition	-0.893** (0.282)	-0.922** (0.327)	-1.116** (0.414)	-14.451 (20.306)	-12.071 (19.756)	-9.763 (19.808)
Innovation intensity	0.474*** (0.108)	0.476*** (0.123)	0.493** (0.159)	28.93*** (7.721)	28.594*** (7.509)	31.844*** (7.387)
Patenting propensity	-0.03 (0.036)	-0.018 (0.042)	-0.027 (0.056)	-1.732 (2.510)	-2.01 (2.443)	-2.025 (2.431)
National Market	0.052 (0.035)	0.047 (0.041)	0.091† (0.054)	6.885** (2.481)	7.09** (2.427)	5.969* (2.415)
European Market	0.069† (0.039)	0.071 (0.046)	0.098 (0.060)	9.227*** (2.733)	9.302*** (2.670)	9.072*** (2.655)
Other markets	0.063 (0.054)	0.068 (0.063)	0.137† (0.082)	10.695** (3.759)	10.851** (3.661)	9.704** (3.639)
Employees (log)	0.062*** (0.010)	0.064*** (0.012)	0.06*** (0.016)	-3.573*** (0.756)	-3.685*** (0.734)	-3.244*** (0.725)
Software development	0.21*** (0.029)	0.218*** (0.035)	0.259*** (0.046)	-4.002* (2.007)	-4.158* (1.949)	-3.977* (1.935)
Enterprise group	0.076* (0.031)	0.107** (0.036)	0.177*** (0.048)	0.514 (2.118)	-0.229 (2.070)	-1.047 (2.066)
Cooperation	0.394*** (0.028)	0.313*** (0.033)	0.411*** (0.043)	3.399† (2.037)	5.324** (1.917)	4.74* (1.914)
Industry dummies ^d	YES†	YES	YES	YES	YES	YES
Constant	2.08*** (0.264)	1.524*** (0.306)	0.933* (0.389)	-9.541 (19.026)	-11.218 (18.506)	-9.006 (18.515)
Observations	1242	1242	1242	1242	1242	1242
Chi ² /Wald F	1275.09	1277.15	1273.08	326.3	391.6	408.5
P-value	0.004	0.001	0.000	0.000	0.000	0.000
Log Likelihood	-6387.91	-5346.74	-4450.13	-3192	-3151	-3139

Standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05, † < 0.1 (two-sided)

Results for industries dummies see appendix A1

^a Selection of CIS questions on the basis of threshold value >3.0 (18 questions)^b Selection of CIS questions on the basis of threshold value >3.5 (11 questions)^c Selection of CIS questions on the basis of threshold value >4.0 (7 questions)^d Wald test on joint significance of industry dummies

Appendix

Table A1. Estimation results for industry dummies

	Degree of business model innovation			Innovation Performance		
	Negative binomial			Tobit		
	Model 1 ^a	Model 2 ^b	Model 3 ^c	Model 4 ^a	Model 5 ^b	Model 6 ^c
Textiles and leather	-0.049 (0.099)	-0.089 (0.119)	-0.042 (0.152)	6.288 (6.611)	7.286 (6.441)	5.935 (6.412)
Wood, paper, printing	-0.006 (0.070)	-0.042 (0.083)	-0.17 (0.111)	-5.728 (4.949)	-5.089 (4.837)	-2.444 (4.817)
Chemicals and pharmaceuticals	-0.036 (0.069)	-0.033 (0.081)	-0.039 (0.104)	1.828 (4.818)	1.655 (4.696)	1.698 (4.683)
Non-metallic mineral products	-0.138 (0.091)	-0.126 (0.108)	-0.115 (0.140)	4.783 (6.128)	4.998 (5.955)	4.387 (5.923)
Basic metals and fabricated metal	-0.159* (0.067)	-0.161* (0.079)	-0.278** (0.104)	-1.245 (4.659)	-1.208 (4.543)	0.779 (4.528)
Computers, electronic and optical	-0.034 (0.070)	-0.048 (0.082)	-0.107 (0.107)	5.229 (4.845)	6.014 (4.716)	7.161 (4.701)
Machinery and equipment	-0.03 (0.068)	-0.008 (0.080)	-0.045 (0.104)	8.06† (4.645)	7.47† (4.524)	8.195† (4.506)
Transport equipment	0.187* (0.091)	0.225* (0.105)	0.201 (0.136)	3.381 (6.406)	1.993 (6.228)	4.131 (6.175)
Manufacturing n.e.c.	-0.12 (0.081)	-0.157 (0.096)	-0.226† (0.125)	1.916 (5.560)	3.066 (5.412)	3.617 (5.405)
Electricity, water supply, waste collection	-0.251** (0.093)	-0.188† (0.108)	-0.215 (0.138)	-9.77 (7.021)	-11.26† (6.822)	-11.078 (6.783)
Trade	0.017 (0.060)	0.064 (0.070)	0.127 (0.091)	-2.547 (4.130)	-4.084 (4.032)	-5.111 (4.027)
Transportation and storage services	-0.31*** (0.071)	-0.299*** (0.084)	-0.319** (0.109)	-13.007* (5.343)	-13.15* (5.227)	-14.061** (5.212)
Information and communication services	-0.054 (0.074)	-0.007 (0.086)	-0.028 (0.112)	5.208 (5.109)	3.738 (4.983)	4.691 (4.957)
+ financial intermediation	-0.203* (0.079)	-0.23* (0.094)	-0.361** (0.124)	3.255 (5.555)	3.635 (5.427)	5.349 (5.429)

Standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05, † < 0.1 (two-sided)

^a Selection of CIS questions on the basis of threshold value >3.0 (18 questions)

^b Selection of CIS questions on the basis of threshold value >3.5 (11 questions)

^c Selection of CIS questions on the basis of threshold value >4.0 (7 questions)

Table A2. Poisson and 2SLS IV regression estimates

	Degree of business model innovation			Innovation performance		
	Poisson			IV Tobit		
	Model 1 ^a	Model 2 ^b	Model 3 ^c	Model 4 ^a	Model 5 ^b	Model 6 ^c
Degree of BMI				3.646** (1.180)	6.651*** (1.523)	8.164*** (1.873)
Life-cycle stage I	0.132*** (0.038)	0.148** (0.051)	0.216** (0.069)	-0.326 (3.207)	0.161 (3.090)	0.42 (3.098)
Life-cycle stage III	0.017 (0.029)	0.026 (0.038)	0.072 (0.052)	0.033 (2.901)	0.229 (2.782)	-0.219 (2.750)
Competition	-0.9*** (0.238)	-0.925** (0.315)	-1.116** (0.414)	-10.86 (20.742)	-7.529 (19.817)	-10.263 (19.606)
Innovation intensity	0.453*** (0.089)	0.472*** (0.118)	0.493** (0.159)	26.977** (8.792)	26.352** (8.051)	31.924*** (7.558)
Patenting propensity	-0.031 (0.030)	-0.019 (0.041)	-0.027 (0.056)	-1.72 (2.460)	-2.03 (2.390)	-2.05 (2.376)
National Market	0.048 (0.030)	0.046 (0.040)	0.091† (0.054)	6.807** (2.438)	6.928** (2.372)	6.039* (2.372)
European Market	0.064 (0.033)	0.07 (0.044)	0.098 (0.060)	8.933*** (2.707)	8.851*** (2.632)	9.033*** (2.609)
Other markets	0.062 (0.046)	0.068 (0.061)	0.137† (0.082)	10.498** (3.719)	10.513** (3.607)	9.875** (3.607)
Employees (log)	0.063*** (0.009)	0.064*** (0.012)	0.06*** (0.016)	-3.653*** (0.967)	-3.81*** (0.848)	-3.082*** (0.763)
Software development	0.209*** (0.025)	0.217*** (0.034)	0.259*** (0.046)	-4.125 (2.572)	-4.448† (2.274)	-3.328 (2.127)
Enterprise group	0.077** (0.026)	0.107** (0.035)	0.177*** (0.048)	0.528 (2.118)	-0.321 (2.081)	-0.641 (2.100)
Cooperation	0.393*** (0.024)	0.313*** (0.032)	0.411*** (0.043)	2.734 (3.824)	4.553† (2.649)	5.428* (2.482)
Industry dummies ^d	YES†	YES	YES	YES	YES	YES
Constant	2.087*** (0.223)	1.526*** (0.295)	0.933* (0.389)	-13.404 (20.357)	-16.632 (19.028)	-8.994 (18.391)
Observations	1242	1242	1242	1242	1242	1242
Chi ² / Wald F	1720.61	1359.71	1273.26	330.9	396.8	414.5
P-value	0.000	0.000	0.000	0.000	0.000	0.000
Log Likelihood	-6439.9	-5352.9	-4454.1	-3230	-3188	-3175

Standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05, † < 0.1 (two-sided)

Results for industries dummies see appendix A1

^a Selection of CIS questions on the basis of threshold value >3.0 (18 questions)^b Selection of CIS questions on the basis of threshold value >3.5 (11 questions)^c Selection of CIS questions on the basis of threshold value >4.0 (7 questions)^d Wald test on joint significance of industry dummies

Table A3. Estimation results for industry dummies

	Degree of business model innovation			Innovation Performance		
	Poisson			IV		
	Model 1 ^a	Model 2 ^b	Model 3 ^c	Model 4 ^a	Model 5 ^b	Model 6 ^c
Textiles and leather	-0.038 (0.085)	-0.086 (0.116)	-0.042 (0.152)	4.022 (3.795)	4.641 (3.723)	4.032 (3.706)
Wood, paper, printing	-0.007 (0.060)	-0.041 (0.080)	-0.17 (0.111)	0.009 (2.656)	0.433 (2.606)	0.955 (2.640)
Chemicals and pharmaceuticals	-0.033 (0.058)	-0.032 (0.078)	-0.039 (0.104)	1.403 (2.717)	1.506 (2.656)	1.41 (2.653)
Non-metallic mineral products	-0.122 (0.078)	-0.122 (0.104)	-0.115 (0.140)	2.19 (3.458)	2.622 (3.353)	2.077 (3.329)
Basic metals and fabricated metal	-0.151** (0.057)	-0.159* (0.076)	-0.278** (0.104)	0.201 (2.716)	0.86 (2.601)	0.905 (2.630)
Computers, electronic and optical	-0.026 (0.059)	-0.046 (0.079)	-0.107 (0.107)	6.363* (2.745)	6.695* (2.690)	6.927* (2.699)
Machinery and equipment	-0.023 (0.058)	-0.006 (0.077)	-0.045 (0.104)	4.88† (2.633)	4.815† (2.571)	5.016† (2.573)
Transport equipment	0.188* (0.076)	0.227* (0.101)	0.201 (0.136)	4.8 (3.983)	3.475 (3.851)	4.708 (3.747)
Manufacturing n.e.c.	-0.117† (0.069)	-0.156† (0.093)	-0.226† (0.125)	1.092 (3.177)	1.902 (3.109)	1.728 (3.107)
Electricity, water supply, waste collection	-0.254** (0.079)	-0.189† (0.105)	-0.215 (0.138)	-4.067 (3.906)	-3.848 (3.632)	-4.424 (3.600)
Trade	0.019 (0.051)	0.066 (0.068)	0.127 (0.091)	-0.27 (2.239)	-0.739 (2.201)	-0.864 (2.209)
Transportation and storage services	-0.304*** (0.061)	-0.298*** (0.082)	-0.319** (0.109)	-2.624 (3.014)	-1.751 (2.762)	-2.685 (2.665)
Information and communication services + financial intermediation	-0.055 (0.063)	-0.007 (0.083)	-0.028 (0.112)	4.319 (2.870)	4.055 (2.785)	4.155 (2.785)
Scientific and technical services	-0.203** (0.067)	-0.23* (0.091)	-0.361** (0.124)	3.61 (3.255)	4.598 (3.119)	4.498 (3.142)

Standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05, † < 0.1 (two-sided)

^a Selection of CIS questions on the basis of threshold value >3.0 (18 questions)^b Selection of CIS questions on the basis of threshold value >3.5 (11 questions)^c Selection of CIS questions on the basis of threshold value >4.0 (7 questions)

Table A4. Negative binomial and tobit regression estimates based on the product innovator sample

	Degree of business model innovation			Innovation performance		
	Negative binomial			Tobit		
	Model 1 ^a	Model 2 ^b	Model 3 ^c	Model 4 ^a	Model 5 ^b	Model 6 ^c
Degree of BMI				1.876*** (0.290)	4.161*** (0.422)	6.834*** (0.579)
Life-cycle stage I	0.094* (0.042)	0.092† (0.055)	0.166* (0.075)	0.34 (3.238)	-0.087 (3.173)	-1.206 (3.149)
Life-cycle stage III	0.024 (0.031)	0.03 (0.041)	0.078 (0.055)	0.816 (2.381)	0.593 (2.334)	-0.217 (2.313)
Competition	-0.498† (0.260)	-0.458 (0.345)	-0.676 (0.452)	-11.677 (20.765)	-9.411 (20.345)	-5.224 (20.236)
Innovation intensity	0.415*** (0.098)	0.47*** (0.129)	0.452** (0.175)	36.162*** (8.286)	33.32*** (8.081)	35.468*** (7.926)
Patenting propensity	-0.015 (0.032)	-0.004 (0.043)	-0.012 (0.058)	-1.929 (2.499)	-2.028 (2.446)	-1.994 (2.418)
National Market	-0.003 (0.033)	-0.018 (0.044)	0.036 (0.060)	5.309* (2.564)	5.678* (2.518)	4.591† (2.493)
European Market	-0.007 (0.037)	-0.013 (0.049)	0.02 (0.066)	7.904** (2.823)	8.226** (2.769)	7.798** (2.739)
Other markets	-0.005 (0.049)	-0.013 (0.066)	0.065 (0.088)	9.424* (3.802)	9.799** (3.724)	8.593* (3.676)
Employees (log)	0.05*** (0.009)	0.053*** (0.012)	0.044** (0.016)	-3.447*** (0.752)	-3.753*** (0.734)	-3.534*** (0.721)
Software development	0.196*** (0.027)	0.2*** (0.036)	0.234*** (0.049)	-1.759 (2.059)	-2.606 (2.005)	-2.847 (1.976)
Enterprise group	0.052† (0.028)	0.069† (0.038)	0.127* (0.051)	-0.087 (2.159)	-0.662 (2.119)	-1.49 (2.102)
Cooperation	0.335†*** (0.026)	0.265*** (0.035)	0.388*** (0.047)	4.847* (2.095)	4.944* (1.971)	3.454† (1.961)
Industry dummies ^d	YES	YES	YES	YES	YES	YES
Constant	1.952*** (0.243)	1.351*** (0.323)	0.801† (0.424)	3.455 (19.431)	-0.221 (19.025)	-1.083 (18.886)
Observations	948	948	948	948	948	948
Log Likelihood	-4699	-4000	-3436	-3079	-3050	-3027

Standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05, † < 0.1 (two-sided)

Results for industries dummies see appendix A1

^a Selection of CIS questions on the basis of threshold value >3.0 (18 questions)

^b Selection of CIS questions on the basis of threshold value >3.5 (11 questions)

^c Selection of CIS questions on the basis of threshold value >4.0 (7 questions)

^d Wald test on joint significance of industry dummies

Table A5. CIS questions indicating innovation in a firm's business model

		Degree of business model innovation version:		
		(a) ^a	(b) ^b	(c) ^c
1	During the three years 2008 to 2010, did your enterprise introduce: New or significantly improved goods (exclude the simple resale of new goods and changes of a solely aesthetic nature)	x	x	
2	During the three years 2008 to 2010, did your enterprise introduce: New or significantly improved services	x	x	
3	Were any of your product innovations (goods or services) during the three years 2008 to 2010 new to your market?	x	x	x
4	Were any of your product innovations (goods or services) during the three years 2008 to 2010 new to your firm?	x		
5	Were any of your product innovations during the three years 2008 to 2010 a first in Austria, Europe or a world first?	x	x	x
6	During the three years 2008 to 2010, did your enterprise introduce new or significantly improved methods of manufacturing or producing goods or services	x	x	
7	During the three years 2008 to 2010, did your enterprise introduce new or significantly improved logistics, delivery or distribution methods for your inputs, goods or services?	x	x	x
8	During the three years 2008 to 2010, did your enterprise introduce new or significantly improved supporting activities for your processes, such as maintenance systems or operations for purchasing, accounting, or computing	x	x	
9	During the three years 2008 to 2010, did your enterprise engage in the following innovation activities: Acquisition of advanced machinery, equipment or software to produce new or significantly improved products and processes	x		
10	During the three years 2008 to 2010, did your enterprise engage in the following innovation activities: Activities for the market introduction of your new or significantly improved goods or services, including market research and launch advertising	x		
11	During the three years 2008 to 2010, did your enterprise co-operate on any of your innovation activities with other enterprises or institutions?	x		
12	During the three years 2008 to 2010, did your enterprise introduce new business practices for organizing procedures (i.e. supply chain management, business re-engineering, knowledge management, lean production, quality management, etc.)?	x	x	x
13	During the three years 2008 to 2010, did your enterprise introduce: New business practices for organizing procedures (i.e. supply chain management, business re- engineering, knowledge management, lean production, quality management, etc.)	x		
14	During the three years 2008 to 2010, 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.)?	x	x	x
15	How important were each of the following objectives for your enterprise's organizational innovations introduced during the three years 2008 to 2010 inclusive: Improve ability to develop new products or processes? (HIGH)	x		
16	During the three years 2008 to 2010, 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.)?	x	x	x
17	During the three years 2008 to 2010, did your enterprise introduce new methods of pricing goods or services (i.e. first time use of variable pricing by demand, discount systems, etc.)?	x	x	x
18	How important were each of the following objectives for your enterprise's marketing innovations introduced during the three years 2008 to 2010 inclusive: Introduce products to new customer groups? (HIGH)	x		

^a Selection of CIS questions on the basis of threshold value >3.0 (18 questions)

^b Selection of CIS questions on the basis of threshold value >3.5 (11 questions)

^c Selection of CIS questions on the basis of threshold value >4.0 (7 questions)

Table A6. Business model operationalization

		Business model element^a
1	During the three years 2008 to 2010, did your enterprise introduce: New or significantly improved goods (exclude the simple resale of new goods and changes of a solely aesthetic nature)	Value creation
2	During the three years 2008 to 2010, did your enterprise introduce: New or significantly improved services	Value creation
3	Were any of your product innovations (goods or services) during the three years 2008 to 2010 new to your market?	Value creation Value delivery
4	Were any of your product innovations (goods or services) during the three years 2008 to 2010 new to your firm?	Value creation
5	Were any of your product innovations during the three years 2008 to 2010 a first in Austria, Europe or a world first?	Value creation
6	During the three years 2008 to 2010, did your enterprise introduce new or significantly improved methods of manufacturing or producing goods or services	Value creation
7	During the three years 2008 to 2010, did your enterprise introduce new or significantly improved logistics, delivery or distribution methods for your inputs, goods or services?	Value delivery
8	During the three years 2008 to 2010, did your enterprise introduce new or significantly improved supporting activities for your processes, such as maintenance systems or operations for purchasing, accounting, or computing	Value creation Value delivery Value capture
9	During the three years 2008 to 2010, did your enterprise engage in the following innovation activities: Acquisition of advanced machinery, equipment or software to produce new or significantly improved products and processes	Value creation
10	During the three years 2008 to 2010, did your enterprise engage in the following innovation activities: Activities for the market introduction of your new or significantly improved goods or services, including market research and launch advertising	Value delivery
11	During the three years 2008 to 2010, did your enterprise co-operate on any of your innovation activities with other enterprises or institutions?	Value creation Value delivery
12	During the three years 2008 to 2010, did your enterprise introduce new business practices for organizing procedures (i.e. supply chain management, business re-engineering, knowledge management, lean production, quality management, etc.)?	Value creation
13	During the three years 2008 to 2010, did your enterprise introduce: New business practices for organizing procedures (i.e. supply chain management, business re-engineering, knowledge management, lean production, quality management, etc.)	Value creation Value delivery
14	During the three years 2008 to 2010, 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.)?	Value creation Value delivery Value capture
15	How important were each of the following objectives for your enterprise's organizational innovations introduced during the three years 2008 to 2010 inclusive: Improve ability to develop new products or processes? (HIGH)	Value creation Value delivery
16	During the three years 2008 to 2010, 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.)?	Value delivery Value capture
17	During the three years 2008 to 2010, did your enterprise introduce new methods of pricing goods or services (i.e. first time use of variable pricing by demand, discount systems, etc.)?	Value capture
18	How important were each of the following objectives for your enterprise's marketing innovations introduced during the three years 2008 to 2010 inclusive: Introduce products to new customer groups? (HIGH)	Value creation Value delivery Value capture

^a Two or more experts indicated that the question relates to either value creation, value delivery, or value creation

CHAPTER 3: CROWDSOURCING BUSINESS MODEL INNOVATION

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Abstract

Successfully adapting existing business models or developing new ones significantly influences a firm's ability to generate profits and develop competitive advantages. However, business model innovation is perceived as a complex, risky and uncertain process and its success strongly depends on whether or not firms are capable of understanding and addressing their customers' needs. This study explores how crowdsourcing-based search approaches can contribute to the process of business model innovation. Drawing on data from a crowdsourcing initiative designed to develop ideas for new business models in the podcast industry, we provide first exploratory insights into the value of crowdsourcing for innovating a firm's business model, and discuss which characteristics of crowd-contributors increase the quantity and quality of the outcome.

Keywords: business model innovation, crowdsourcing, open innovation, distant search, complex problem solving

Introduction

Successfully creating value for customers, delivering it to them and capturing value from doing so, i.e., innovating business models, is increasingly considered as a main driver of performance and competitiveness of firms (e.g., Chesbrough, 2010; Teece, 2010, Zott, Amit and Massa 2011). However, developing new business models or changing existing ones is a complex, risky and highly uncertain process (e.g., Im and Cho, 2013, Sosna et al. 2010), not least because business model innovation requires experimentation (McGrath, 2010), a specific leadership agenda (Smith *et al.*, 2010) and boundary-spanning capabilities (Zott and Amit, 2010). Finding ways of alleviating the process of developing new business models and reducing the risk of failure is thus essential for the success of business model innovation (Chesbrough, 2010).

Recent discussions and practical applications related to reducing the complexity of business model innovation focus on rigorously structuring business model innovation efforts at the expense of missing out on addressing the dynamics and interdependencies inherent to a business model (e.g., Massa and Tucci, 2013). Since one of the most important aspects of successful business model innovation is that firms understand and address the needs of their current (and future) customers (e.g., Chesbrough, 2007, Teece, 2010, Zott and Amit 2011), this article takes a different approach to contributing to the agenda of alleviating business model innovation. Building on recent insights related to the value of crowdsourcing for problem solving in general and product innovation in particular (e.g., Afuah and Tucci, 2012, Jeppesen and Lakhani, 2010), and the increasing role of crowdsourcing as a way of opening up a firm's business model towards external partners (e.g., Bogers, Afuah and Bastian 2010; Boudreau and Lakhani, 2013) the aim of this paper is to investigate how crowdsourcing-based search mechanisms can contribute to the process of developing business model innovation.

We argue that activating self-selection among crowds of users may provide similar results for business model innovation as existing research shows for product

innovation (e.g. Poetz and Schreier, 2012, Nishikawa, Schreier and Ogawa, 2013) for two reasons. First, crowdsourcing user ideas for business model innovation may overcome the sticky-information problem (von Hippel, 1998) involved in firms' traditional attempts of accessing need-based information of existing and/or future customers as an input to business model innovation. Second, it is expected that the knowledge-related benefits from drawing on a large and diverse crowd of users (e.g., Jeppesen and Lakhani, 2010) are not limited to need- and solution-based information relevant for generating novel value propositions. Based on, for example, users' professional backgrounds it is likely that at least some users within a crowd also hold knowledge about how to innovate the way a firm delivers or captures value. While it might appear almost contradictory to directly ask users about how a firm can generate or increase its profit while most of them might prefer to pay as little as possible for as long as possible, we furthermore argue that aspects related to the users' motivation, attachment to the product or brand, prior knowledge and characteristics (e.g., Füller, Matzler, and Hoppe, 2008; Poetz and Schreier, 2012; Franke, Keinz, and Klausberger, 2012; Villarroel and Tucci, 2010) as well as factors connected to the problem's modularizability (Afuah and Tucci, 2012) influence whether (or not) crowds are willing and able to contribute their knowledge to business model innovation.

To explore our research question related to the value of crowdsourcing for business model innovation we conducted an empirical study in which we crowdsources and evaluated business model ideas for Sweden's most popular podcast, Filip and Frederik's podcast (www.filipandfrederik.com). The podcast industry is an appropriate field for studying the value of crowdsourcing for business model innovation since it has generally experienced a rapid growth over the past years, both in terms of listeners and podcasts, and podcast producers including Filip and Frederik have already started experimenting with new forms of creating, delivering and capturing value.

Our findings demonstrate that crowdsourcing business model innovation produces a considerable number of novel and valuable ideas with respect to all major dimensions of business model innovation, i.e. value creation, value delivery and value capture. More than 20 percent of the submitted ideas include novel component ideas for four or more elements of the business model canvas, i.e. display a high degree of change and can be considered radical business innovation (Hartmann, Oriani, and Bateman, 2013c; Mitchell and Coles, 2003). The degree of change strongly correlates with the quality of ideas, i.e. those users who submit business model ideas comprising of several different component ideas tend to provide inputs with higher levels of novelty and value. Investigating the drivers of idea submission and idea quality reveals that users who display high levels of lead usersness and personal creativity are specifically qualified to contribute to business model innovation. Interestingly, we furthermore find that while perceived fairness of the crowdsourcing initiative positively influences the likelihood of submitting ideas as well as the ideas' degree of change, attachment to the podcast in terms of how much users perceive themselves to be fans has a negative effect on both, the quantity and the quality of the outcome. Finally, our findings also indicate a number of prior knowledge assets such as experience with business model innovation to impact both the qualitative and quantitative outcome of business model innovation. We present these in more detail as part of the findings section of this paper.

THE VALUE OF BUSINESS MODEL INNOVATION

Business model innovation is increasingly recognized as one of the most important sources of creating competitive advantage in rapidly changing environments driven by new technologies, changes in customer preferences, and new regulations (Chesbrough, 2010; Sako, 2012; Teece, 2007b; Teece, 2010; Zott *et al.*, 2011). Successfully adapting existing business models or developing new ones significantly influences a firm's ability to generate profits (Chesbrough, 2010; Hartmann *et al.*,

2013c; Sosna *et al.*, 2010; Teece, 2010) and is thus considered to be the most sustainable form of innovation (Johnson *et al.*, 2008; Teece, 2007b; Teece, 2010; Wirtz, Schilke, and Ullrich, 2010).

Although widely used in recent strategy literature (e.g., Baden-Fuller and Mangematin, 2013; Casadesus-Masanell and Zhu, 2013; Zott *et al.*, 2011) and practitioner discussions (e.g., Chesbrough, 2007; Pohle and Chapman, 2006), the business model concept itself is criticized for lacking clarity (Saebi and Foss, 2014). Not least, this is due to a number of different approaches and definitions that have been presented over the last decade (e.g., Baden-Fuller and Morgan, 2010; Chesbrough and Rosenbloom, 2002; Johnson *et al.*, 2008; Morris *et al.*, 2005). However, there seems to be growing consensus that business models specify firms' value-creation and value-capture mechanisms (Massa and Tucci, 2013; Zott *et al.*, 2011). By enabling new forms of value creation, value delivery, and value capture, business models can be a subject of innovation in itself (Sako, 2012; Zott *et al.*, 2011). Examples such as Dell, Xerox, E-Bay or Apple are often used to outline the positive effects of successful business model innovation on firm performance and competitiveness (e.g., Chesbrough, 2003; Johnson *et al.*, 2008). However, successfully developing a new business model is perceived as a highly uncertain and risky process (Sosna *et al.*, 2010). With business model innovation firms cannot hold on to analytical approaches, business model innovation demands a "discovery driven approach" (McGrath, 2010). Especially incumbents need to overcome organizational inertia (Sosna *et al.*, 2010) and find ways to manage conflicts with existing business models (Chesbrough, 2010; Christensen, 2006) in order to be successful with business model innovation. However, this is a complex task and managers often find it difficult to identify, evaluate and select qualified new business models (Im and Cho, 2013). Beyond the uncertainty involved in experimenting with new business models, many firms simply cannot risk to get business model innovation wrong (Chesbrough, 2010; McGrath, 2010). Sosna *et al.* (2010), for example, argue that

firms are usually neither able to bear the costs of failing with business model experimentation nor willing to risk losing market share as a result of unsuccessful attempts. Chesbrough (2010) thus emphasizes how important it is for firms to develop capabilities for alleviating the process of successful business model innovation.

One factor that is discussed as being most important for successful business model innovation is that firms understand their current (or potential) customers' needs, i.e., firms need to know what their users want, how they want it and how they can organize themselves to meet those needs, while capturing value from doing so (Chesbrough, 2007; Im and Cho, 2013; McGrath, 2010; Sosna *et al.*, 2010; Teece, 2010; Zott and Amit, 2010). However, due to the sticky nature of need-based information (von Hippel, 1998) it is often difficult to obtain the knowledge that is required for fuelling the design of successful new business models (Teece, 2007b; Teece, 2010).

THE ROLE OF CROWDSOURCING IN BUSINESS MODEL INNOVATION

Involving users more directly by allowing them to contribute solution-based information to innovation processes has turned out to be a successful way of overcoming the sticky information problem in the development of new products or services (e.g., von Hippel, 2005). One of the most recent ways of opening up innovation processes and involving users is known as crowdsourcing, defined as the act of outsourcing a task to a large and potentially unknown "crowd", rather than to a designated "agent" (an organization, informal or formal team, or individual), such as a contractor, in the form of an open call (Afuah and Tucci, 2012). In spite of crowdsourcing as a formal term being relatively new, much research has already started to touch upon the potential benefits of involving crowds in the process of developing new products and services (e.g., Jeppesen and Lakhani, 2010; Poetz and Schreier, 2012; Nishikawa *et al.*, 2013). These include knowledge-related benefits suggesting that

drawing on a large and diverse base of knowledge, skills, and pre-existing solutions can increase the likelihood that a given problem is solved, reduce the time required to solve the problem, and generally lead to more novel and valuable outcomes.

While crowds can be engaged in many ways, one of the most straightforward and popular approach is through contests, typically made available to a large and diverse group of potential problem solvers or contributors (e.g., Boudreau and Lakhani, 2013). These contests are performed in a tournament-based setting where each agent from the crowd (individual solver/contributor) self-selects to work on its own solution to a problem, and the best solution is then chosen as the winner (Afuah and Tucci, 2012). When a competitive setting is more (or less) appropriate than a collaborative one is discussed by Boudreau and Lakhani (2009). The authors identify the type of innovation, the motivations of the innovators, and the business model of its platform as critical issues that have to be addressed when making the decision between collaborative communities or competitive markets.

In the context of business model innovation the concept of crowdsourcing has so far been discussed as enabling new forms of business models in relation to the value-creating part, notably the generation of new product ideas and user involvement. Threadless, for example, succeeded with designing a business model in which a large community of platform users continuously submits novel t-shirt designs and additionally selects the best ones for mass production (e.g., Ogawa and Piller, 2006). While crowdsourcing is increasingly considered to be a way of opening up a firm's business model towards external partners, particularly users (e.g., Bogers *et al.*, 2010; Djelassi and Decoopman, 2013), little research has investigated the role of crowdsourcing in the actual process of business model innovation.

That crowdsourcing contributes to the value-creating part of business models (e.g., Poetz and Schreier, 2012; Nishikawa *et al.*, 2013) is not surprising since there are good arguments for why users are capable of contributing novel value propositions to

firms' innovation activities (cf. von Hippel, 2005), motivated to do so (cf. Jeppesen and Frederiksen, 2006), and specifically qualified to respond to crowdsourcing-based search approaches (e.g., Poetz and Schreier, 2012). However, crowdsourcing may theoretically impact all business model components including customer value proposition, market segments, revenue model, growth model and capabilities (Afuah, 2014). In particular, activating self-selection among a large and diverse group of potential contributors, and by doing so transforming what is a distant search for the problem owner into a local search for the problem solvers (Afuah and Tucci, 2012), is not limited to accessing knowledge on novel value propositions related to specific market offerings. Crowdsourcing-based search approaches have successfully also been applied to, for example, gaining scientific insight (Jeppesen and Lakhani 2010; Franzoni and Sauermann, 2014; Guinan, Boudreau, and Lakhani, 2013), selecting promising new ventures via crowdfunding (Mollick, 2013), identifying markets for existing technologies (e.g., marblar.com) or developing marketing campaigns (e.g., tongal.com). Specifically the latter applications indicate that a large and diverse crowd may also possess knowledge, skills, and pre-existing solutions with respect to delivering and capturing value in business model innovation. Some users within the crowd likely even know about how to innovate an existing revenue model because they, for example, have prior experience in founding their own businesses within and outside the industry of the firm that is searching for business model innovation (Cliff, Jennings, and Greenwood, 2006).

While it is likely that crowds possess relevant knowledge for business model innovation, it is, however, less clear whether or not (at least some) users within the crowd are also willing and able to contribute their knowledge, specifically with respect to ideas for delivering and capturing value. For product or service innovation it has been shown that users often freely contribute to firm-hosted crowdsourcing initiatives because eventually, they might get a product or service they need and want themselves

(cf. von Hippel, 2005). For business model innovation other intrinsic and extrinsic motivational factors including monetary incentives in tournament-based crowdsourcing initiatives and non-monetary incentives related to, for example, building a reputation and potentially inducing future collaborations with the hosting firm (e.g., Villaroel and Tucci, 2010; Afuah and Tucci 2012) may be more effective in activating contributions. Another factor that reportedly influences whether or not users are willing to contribute their knowledge is the extent to which they perceive the crowdsourcing initiative to be fair (Franke, Keinz and Klausberger, 2013). Related to the fairness argument it is important to consider how participation is solicited since any co-creation project carries risks for conflicts, may create frustration among participants and evoke angry reactions such as negative word-of-mouth in social media from contest participants if expectations are not met or the spirit of the process is violated (Gebauer, Füller and Pezzei, 2013). Paying attention to fairness aspects may specifically be important in the process of crowdsourcing business model innovation since the incentives of providers and users related to capturing value can clearly diverge.

Furthermore, crowd members' willingness to contribute to business model innovation may be influenced by how much they are attached to the product or brand of the firm. A strong passion for the product or brand usually facilitates users' willingness to share their ideas and participate in firm-hosted innovation efforts (e.g., Sawhney, Verona, and Prandelli, 2005; Füller, Jawecki, and Mühlbacher, 2007). In a more recent study, however, Füller, Matzler and Hoppe (2008) find that brand identification is less a driver for engaging in crowdsourcing processes than brand community members' general interest in (open) innovation activities and their creative personalities. With respect to the quality of brand community member's contributions there is some evidence that those with a strong attachment to the product or brand ("fans") are capable of making specifically valuable contributions to firm-hosted innovation projects (e.g., Kozinets, 2002) because of their extensive experience with the existing product or

brand. However, the innovativeness of their contributions may be constrained by the negative effects of path dependency and functional fixedness (e.g., Duncker, 1945; Chrysikou and Weisberg, 2005) to a higher degree than those of non-fans. In addition, stronger attachment to the existing product or brand may also entail a higher resistance to change in general (cf. Muniz and Schau, 2005) and thus either limit users willingness to contribute ideas to business model innovation at all or constrain the novelty of their contributions. Related to this and in line with what Christensen (1997) describes as the innovators dilemma crowdsourcing business model innovation may have limited potential for radical change if the crowd involved consists of existing customers or users only.

Finally, applying crowdsourcing-based search mechanisms for business model innovation may be constrained by the complexity of the problem itself. Though (at least) some users within a crowd are likely to possess knowledge for business model innovation and willing to share it, they may not be able to understand the problem and thus cannot transfer their knowledge without interacting with the focal firm (Afuah and Tucci, 2012). Its boundary spanning nature (Zott and Amit, 2010), the need for experimentation (McGrath, 2010), and the specific leadership agenda required (Smith *et al.*, 2010), make business model innovation, without doubt, a complex and tacit problem that cannot easily be articulated or codified for being broadcasted to a crowd. Afuah and Tucci (2012) suggest that in order to solve complex problems with crowdsourcing, the problems have to be simplified to make them easier to understand for potential problem solvers, which involves the risk of misrepresenting the problem. However, if the problem is modularizable, problem complexity can be reduced, specifically if there are not a lot of interdependencies between the subtasks (Afuah and Tucci, 2012). In business model innovation, modularizing the problem may be addressed by using graphical business model frameworks. Graphical frameworks of the business model, which are a conceptualization and formalization of the business model

obtained by enumerating, clarifying and representing its essential components (Massa and Tucci, 2013) offer a rigorous approach to structuring business model innovation efforts. Massa and Tucci (2013) assume the power and popularity of these frameworks stem from their simplicity and parsimony, which in turn comes at cost of the descriptive depth and their inability to represent the dynamics inherent to a business model. A popular example among managers and practitioners of such a graphical framework is the Business Model Canvas (Osterwalder and Pigneur, 2010), which decomposes a business model into nine components.

Method

We use a quantitative explorative approach to investigate the potential role of users in the generation of ideas for business model innovation. Similar to other studies in the field (e.g., Piller and Walcher, 2006; Poetz and Schreier, 2012) we first collected user ideas for a specific real-world problem (in our case business model innovation), then measured the characteristics of the contributing users, and finally had the outcome of the idea generation process evaluated by independent industry experts.

In order to address our research question on the value of crowdsourcing for business model innovation an appropriate research context had to meet the following criteria related to both, the user perspective and the firm perspective. Starting from the user perspective, first, users needed to have strong commitment to share their ideas. Else, it would not be possible to get enough useful inputs for both the users themselves and the firm. Second, users needed to have a basic understanding of the current business model of the firm in order to contribute. If the problems posed to users are too complex and demand a high level of expertise, average users will be constrained in their ability to contribute meaningful ideas (Nishikawa, Schreier, and Ogawa, 2013). From the firm perspective, the criteria to be met were that there is an intention to change the current business model, and that the firm is willing to open up its business model innovation

process and launch a crowdsourcing initiative. Additionally, the firm needed to have a large enough user community to ensure a sufficient sample size.

To meet these criteria, our data was collected in cooperation with Sweden's most popular (audio) podcast, Filip & Fredrik's podcast (www.filipandfredrik.com). The podcast industry in Sweden has experienced rapid growth in terms of numbers of listeners and podcasts in recent years (Svenska Dagbladet, 2012). Due to the recent appearance of the podcast industry, podcast producers show frequent experiments with different business models. The hosts of the podcast, Filip Hammar and Fredrik Wikingsson, have both a background as journalists and TV-hosts, and are among Sweden's most popular TV-hosts. In 2010 they started the Filip & Fredrik's podcast, and since then, have produced more than 200 episodes. With more than 250,000 listeners, it is one of Sweden's most listened podcast

Filip and Fredrik's weekly podcast is an entertaining, fun and thoughtful conversation between two best friends. The topics revolve around their personalities, celebrities and their daily lives. The recording is done without manuscript to create a spontaneous feeling. The podcast is targeted at men and women between 25-45 years old and is distributed through Spotify, iTunes, the podcast's own website, and a Swedish podcast aggregator. Revenues are derived from sponsored segments where Filip and Fredrik describe a product, service or organization. Costs mainly relate to the salaries of Filip and Fredrik and the audio production editor. Sales of sponsored segments are done by SBS Discovery Media, a European media group.

Filip and Fredrik's podcast has a highly engaged fan community. Listeners have already been contributing jingles, posters and fan-websites over the past years. Since Filip and Fredrik's podcast has been active for more than three years, listeners are already familiar with its business model. At the time of the study, the current business model did not involve any further technical components than needed to download a podcast, and was comparable to other radio or media offerings in the Swedish market.

Barriers to business model experimentation might emerge as a result of the initial business model due to expectations from existing podcast followers and the success of the established business model. There is an obvious risk of losing listeners with unsuccessful business model experiments that do not meet the expectations of existing podcast followers. Additionally, the success of established business models may lead firms to miss out potentially valuable ideas when they do not fit with their current business model (Chesbrough, 2010; Chesbrough and Rosenbloom, 2002; Chesbrough, 2010).

Hammar and Wikingsson have stated in the podcast and in a personal interview that they are trying to improve the podcast's business model, but are not certain about the direction they should take. Due to the large coverage of the podcast with 60 min playing time each episode, they believe that there is more potential value in the podcast, both to them and the listeners, than currently captured. As a result, Hammar and Wikingsson were highly interested in launching a crowdsourcing initiative for generating business model ideas among their large base of listeners.

DATA COLLECTION

Podcast users were invited to submit proposals of how to innovate the business model around Filip and Frederik's podcast using Osterwalder and Pigneur's (2010) business model canvas. In pre-tests comparing different graphical frameworks, the business model canvas was selected as the most appropriate framework for modularizing the complex task of business model innovation in this project, as its level of detail is high enough to describe useful business model ideas, yet it is still simple enough for being communicated to non-professionals. Contributors had the opportunity to submit their ideas to every building block of the canvas but were not obliged to do so. To alleviate the users' process of contributing business model proposals we provided a short description of how each of the building blocks is designed in the current business

model. Contributors had the choice to either submit a new idea for each of the building blocks, state that they are not satisfied with how this building block is currently designed but don't have an idea, or actively indicate that they wanted this building block to remain as it is right now. To stimulate participation, the crowdsourcing initiative was introduced in episode 146 of Filip and Fredrik's podcast. Hammar and Wikingsson briefly described the purpose of the crowdsourcing initiative and provided the website where users could locate it. The link to the online participation form was also posted on the podcast's website, in social media and at the fan-pages of Filip and Fredrik's podcast.

Following the contingency arguments put forward by Boudreau and Lakhani (2009) we opted for a competitive setting in the design of the crowdsourcing process since business model innovation demands experimentation and high levels of heterogeneity in the pool of solvers. Furthermore, the level of intrinsic motivations might be limited because of a potential conflict of interest between users and Filip and Frederik with respect to aspects of value delivery and capture. Additionally, in early stages of business model innovation the community aspects of learning and knowledge sharing might not be as important as in later stages. Finally, there was a need for control of the environment and the study procedure.

In a second step, contributing users automatically received a questionnaire they had to fill in for completing their participation in the crowdsourcing process and winning a meeting with Filip and Fredrik during the production of a new episode of their podcast. The questionnaire included measures on the users' characteristics, experiences and knowledge assets relevant for explaining the likelihood of submitting novel and valuable ideas for Filip and Fredrik's future business model.

Overall, 422 users contributed a business model proposal and completed the survey. Consistent with the target group of Filip and Fredrik's podcast, participants were predominantly male (83%) and the mean age was 26.18 years ($SD = 6.91$). The

majority of the sample reported to either be employed (55%) or study (33%). With regards to their educational background, 62% reported to have an academic degree, most of them within another subject than business (74%). Four ideas clearly had a humorous intention only and were excluded from further analysis, resulting in a final sample of 418 users.

MEASUREMENT OF DEPENDENT VARIABLES

Degree of change

The measure for the degree of business model innovation is a count variable for the number of individual business canvas components for which users suggested new ideas as part of their overall business model idea. The number of modified business model components is used as an indicator for the radicalness of a business model innovation in several studies in the field, e.g., by Hartmann *et al.*, 2013c; Mitchell and Coles, 2003. Whereas a small number of modified components is referred to as business model modification, a high number indicates business model innovation. Our main interest here is to understand whether users are able to propose radical business model innovations rather than just small modifications of existing business models. We modified the original business model canvas in that we combined the components "Key Activities" and "Key Resources". The distinction between these two components is often difficult to draw, compared to other components, and therefore difficult to achieve for users. Combining the two components reduced the maximum amount of components for which users could submit individual ideas from nine to eight, resulting in a range from 0-8 for this measure.

Novelty and value of ideas

In order to identify viable business models recent entrepreneurship techniques such as the lean startup approach (Blank, 2013) or effectuation (Sarasvathy, 2001) put high emphasis on experimentation, early customer feedback and iterative design

approaches. Following these approaches, the only way to ultimately assess the value of a business model idea is through real-life experimentation. Since it is not feasible to real-life experiment with all the business model ideas generated by the crowd, we apply expert ratings to obtain an indicator for whether or not an idea is worth experimenting with. We adopted an expert rating process in which independent industry experts were asked to evaluate the outcome of the crowdsourcing process. We first identified two experts on business models in the digital entertainment industry and then asked them to individually rate the business model ideas using an online tool specifically built for this purpose. Both experts are senior managers in Swedish media companies and are active management consultants in the field of digital entertainment.

Following a procedure proposed by Krippendorff (2004), the experts received an evaluation manual prior to starting the rating process. The manual provided comprehensive information on the source, type and nature of the ideas, the business model concept and the definition used in our study, the evaluation criteria and the rating scales. This was done in order to ensure that all participating experts had a similar understanding of the task and apply the rating criteria in a similar way.

The experts were asked to assess the novelty of the resulting business model ideas compared to (a) existing business models in the podcast industry, and (b) existing business models in the digital entertainment industry on a five-point rating scale (where 1 = not very novel and 5 = very novel). We merged the five-point rating scales into a single novelty index (Cronbach's $\alpha = 0.98$). Furthermore, experts were asked to assess the value of the business model ideas in terms of (a) how much value the resulting business model would provide to listeners of the podcast, and (b) to Filip and Fredrik on a similar five-point rating scale (where 1 = not much value and 5 = a lot of value). Again, we merged the five-point rating scales into a single value index (Cronbach's $\alpha = 0.90$). As a control, a final question asked experts whether or not

they would suggest implementing the resulting business model as a whole or, if not, certain components of it.

The ideas were presented for evaluation in random order. Interrater reliability was assessed with Krippendorff's alpha for the two novelty and value items (values of .67 and greater are generally considered to be satisfactory; Krippendorff, 2004). The agreement coefficients for the two novelty dimensions are 0.67 and 0.65, for the value dimensions 0.72 and 0.67 respectively. Given the inherent difficulty in rating business model ideas, the results seem to be satisfactory (Amabile *et al.*, 1996; Franke, Von Hippel, and Schreier, 2006; Krippendorff, 2004; Kristensson, Gustafsson, and Archer, 2004).

MEASUREMENT OF INDEPENDENT VARIABLES

Lead userness

We measured participants' "lead userness", which has often been documented as a robust predictor of an idea's novelty (Franke *et al.* 2006), using an eight-item measure ("LU1: In my opinion, there are still potential opportunities not being passed up by entertainment podcasts offered today, "LU2: I have needs related to entertainment podcasts that are not covered by what is currently offered on the market, "LU3: I am dissatisfied with some aspects of entertainment podcasts that are currently available on the market", "LU4: I usually try out new digital entertainment products such as podcasts as soon as they are offered", "LU5: I have significantly benefited from early adopting and using new digital entertainment products", "LU6: I have been involved in testing prototype versions of new digital entertainment products", "LU7: I am considered as being on the cutting-edge when it comes to new digital entertainment products", "LU8: I already developed ideas for new digital entertainment products myself"; items adapted from Franke and Shah 2003 and Franke *et al.* 2006; Cronbach's $\alpha = 0.76$).

Personal creativity

Users' likelihood of being creative and able to innovate is also driven by personality traits (Im, Bayus, and Mason, 2003; Kirton, 1976). We apply the Buffalo Creativity Process Inventory (Puccio, 1999) to measure personal creativity as adapted by Franke, Poetz, and Schreier, 2013), items used are "PC1: I enjoy spending time looking beyond the initial view of the problem", PC2: "I enjoy working on ill-defined, novel problems", "PC3: I enjoy stretching my imagination to produce many ideas", "I like to work with unique ideas"; Cronbach's alpha = 0.79.

Perceived fairness

Franke *et al.*, 2012 identified perceived fairness as being central for users' willingness to contribute ideas to firm-hosted idea generation processes. We use a five-item measure ("PF1: This idea generation contest gives both, participants and Filip & Fredrik a fair stake in the process of developing the podcast's business model", "PF2: Regarding what Filip & Fredrik and the participants get from this process, there is justice", "PF3: For those submitting an idea, the benefit offered for participating in the idea generation contest exceeds the effort required", "PF4: Submitting a proposal to this idea generation contest might be a good deal for anybody submitting an idea", "PF5: If your proposal of the new business model would be turned into practice, do you think that in this model both the listeners and Filip & Fredrik get a fair share?"; items adapted from Franke *et al.* (2013); Cronbach's alpha = 0.77)

Users' experience and knowledge assets

Following Luqthje (2004) we divide a user's expertise into knowledge and experience. We measured business knowledge using a self-constructed three-item measure ("BK1: I've received education on how to construct a business and manage the implications of it", "BK2: I have thorough knowledge of how to seize a business opportunity", "BK3: I always try to keep up to date with regard to the new business

models concepts and news regarding firms with new business models"; Cronbach's alpha = 0.74).

Whether or not users received business education was captured with a dummy variable ("What type of education do you have? 0 = Without business background 1= With business background"). We used the number of years someone was working in a management position as a measure for business experience ("Are you working in role where you have to make business decisions? If yes – How many years have you possessed that kind of role?").

To capture experience with business model development we asked for how many times users have been involved in the process of developing business models ("Do you have experience from developing or being involved in developing a business model? How many times?").

In a similar way we captured founding experience with the number of firms founded ("Have you experience from founding your own or been involved in starting a firm? If yes how many have you started?"). We used a dummy variable for product knowledge ("I have thorough knowledge of what goes into a production of a podcast"; 1: Yes, 0: No). Whether or not users have industry experience was captured with a dummy variable ("In which industry are you currently working in?" 0 = Other 1 = Digital entertainment industry).

Users' relationship to Filip and Frederik's podcast

To what extent users consider themselves fans of Filip & Fredrik was measured on a 5-point scale ("I am a fan of Filip & Fredrik", 1 = No fan, 5 = Huge fan). Additionally we used a dummy variable to account for users' listening frequency related to Filip & Fredrik's podcast (0 = Less than every week, 1 = Every week).

Control variables

We included dummy variables for the current occupation (Student; Employed; Unemployed; Entrepreneur; Other), and for education (Elementary school; High school; College; PhD or similar). Finally, we also controlled for age and gender.

Findings

We first provide analyses related to the quantitative outcome of crowdsourcing business model innovation and present patterns related to how many ideas were actually submitted and how these submitted ideas relate to different components of the business model canvas. We furthermore explore the relationships between different characteristics of crowd contributors and the likelihood of providing ideas for business model innovation subject to different business model components. Second, we investigate the outcome quality of crowdsourcing business model innovation in relation to both, different business model components and characteristics of the crowd-contributors.

ANALYSIS OF OUTCOME QUANTITY

Descriptive statistics

Does crowdsourcing business model innovation work at all? In order to provide an answer to this question, we descriptively explore quantitative contribution patterns subject to components of the business model canvas. We find that out of the 418 users who participated in the crowdsourcing initiative 64.4 percent (269 users) submitted ideas for business model innovation. Out of the 149 users who did not submit proposals, 91 stated that they are satisfied with all components of the current business models. The 51 remaining users who did not submit an idea indicated that they were not satisfied with all components of the current business model, but did not have ideas for improvement.

Insert Table 1 about here

Group 1 consists of 149 contributors who were satisfied with all components of the current business model and, hence, did not propose to change any of the components. Group 2 relates to 149 users who provided one to three component ideas, and group 3 comprises 88 contributors who proposed changing four or more business model components.

Of the 777 individual component ideas 200 belong to aspects of customer relationship, 139 are concerned with the product, 239 with business model infrastructure and 199 with the revenue model (Table 2, see Appendix 1 for sample ideas). Contributions thus interestingly span all basic dimensions of a business model, namely value creation (48.6 percent), value delivery (25.7 percent), and value capture (25.6 percent). We did not find any dominant combinations of individual business model components within groups 2 and 3, i.e., among those users who submitted more than one component idea (see Appendix 2).

Insert Table 2 about here

While the majority of users who contributed only one component idea for innovating Filip and Frederik's business model provided this idea to the value-creating part of the business model (62.3 percent), individual component ideas are more equally distributed among the main dimensions of business model innovation (value creation, value delivery and value capture) for users who provided two or more component ideas (see Table 3). For example, out of 52 users who provided a business model idea

comprised of three individual component ideas already 28.7 percent include ideas for capturing value and 23.7 percent provide component ideas for delivering value.

Insert Table 3 about here

Drivers of idea quantity

In this section we investigate which characteristics of crowd-contributors' influence whether or not they submit ideas for business model innovation. Table 4 shows that participants who submitted an idea for innovating Filip and Frederik's business model (i.e., provided one or more individual component ideas) significantly differ from non-submitters in terms of how fair they perceive the crowdsourcing initiative to be ($p = 0.01$) and with respect to their prior business experience ($p = 0.07$).

Insert Table 4 about here

Exploring the characteristics of contributors broken down by their submissions of component ideas for value creation, value delivery and value capture (Table 5) reveals that ideas to any of the three main business model dimensions are submitted by users with significantly higher levels of lead useriness ($p = 0.09$ for value creation, $p = 0.02$ for value delivery, and $p = 0.00$ for value capture) and personal creativity ($p = 0.01$ for value creation and capture, and $p = 0.10$ for value delivery). To which extent a contributor perceives the crowdsourcing initiative to be fair influences the submission of component ideas for value creation and value capture ($p = 0.00$). Business knowledge increases the likelihood that users submit component ideas for delivering and capturing value ($p < 0.05$). Prior experience with developing business models ($p < 0.10$) and

founding a firm ($p = 0.00$) affects whether or not users submit component ideas for capturing value in business model innovation.

Exploring user characteristics with respect to the likelihood of submitting ideas to individual business model components provides further interesting findings (Appendix 3). Component ideas for innovating the cost structure of a business model are submitted by contributors who score significantly lower with respect to being a fan of Filip and Frederik's podcast as compared to those who do not submit an idea for this component ($p = 0.07$). Furthermore we find that knowledge about the product positively influences the likelihood of submitting component ideas for the components "customer relationship" ($p = 0.04$), "channels" ($p = 0.10$), and "cost structure" ($p = 0.02$).

Insert Table 5 about here

Regression analyses for exploring how contributors' characteristics influence whether or not they provide ideas for business model innovation (Table 6) show that perceived fairness of the crowdsourcing initiative significantly increases both the likelihood of contributing an idea at all (Model 1) and the degree of change in business model innovation, i.e., the number of individual business model components that were newly suggested as part of a user's business model idea (Models 2 and 3). While contributors' lead userness and personal creativity furthermore have a positive effect on the degree of change in crowdsourcing business model innovation, being a fan decreases the likelihood of both contributing at all and submitting more than one component idea. Finally, we find that having experience with business model innovation generally decreases the likelihood of contributing an idea.

Insert Table 6 about here

ANALYSIS OF OUTCOME QUALITY

So far, we have seen that a crowdsourcing business model innovation generates a substantial number of contributions whose individual component ideas are surprisingly spread among all of the three major dimensions of business model innovation, i.e., among value creation, delivery, and capture. Contributing ideas is mainly driven by users' lead userness, personal creativity and perceived fairness of the crowdsourcing initiative while being a fan negatively influences contributions to crowdsourcing business model innovation. In this section we investigate whether or not these patterns hold when taking into account the quality of the submitted ideas. After providing some basic descriptive insights into the quality of crowd-sourced ideas for business model innovation, we explore how the quality of ideas relates to outcome quantity and relates to different business model components. Like we did with idea quantity, we finally investigate how different crowd-contributor characteristics influence the quality of ideas in business model innovation.

Description of outcome quality and its relation to outcome quantity

The outcome of ideation processes usually does not follow a normal distribution. Only few ideas are truly good, while the bulk will be mediocre or even poor (Singh and Fleming 2010). This pattern, which Fleming (2007) termed the "long tail of innovation," was to a certain extent also visible in our data. With respect to the novelty of ideas we find that 13 (4.83 percent) / 45 (16.73 percent) ideas range in the top 10 / 20 percent of the novelty distribution. Related to the value dimension 24 (8.92 percent) / 49 (18.22 percent) ideas can be assigned to the top 10 / 20 percent of the value distribution.

For 25 business model ideas both experts agree that Filip and Frederik should fully implement them. Of these ideas, 60 percent include component ideas for value creation, 63 percent comprise suggestions for new ways of delivering value and 72 percent relate to ideas for capturing value in business model innovation. Ideas suggested for implementation significantly differ from the rest in terms of their novelty ($M_{\text{novelty_implement}} = 2.35$, $M_{\text{novelty_not implement}} = 1.55$, $p = 0.00$) and value ($M_{\text{value_implement}} = 3.81$, $M_{\text{value_not implement}} = 2.49$, $p = 0.00$). In addition to 25 ideas for which both experts recommend implementation, they agreed on 53 ideas that include individual components Filip and Frederik should definitely consider implementing. Of these, 88.7 percent include component ideas for value creation, 77.4 percent provide ideas for value delivery and 71.7 percent refer to novel ways of capturing value. Again, the novelty and value ratings for these ideas are significantly higher ($p = 0.00$) than for the rest.

Investigating the ideas for which both experts recommend implementation ($n = 25$) in more detail shows that more than half of the ideas in this group (16 ideas) comprise component ideas related to capturing value only or combine them with component ideas for creating or delivering value. Ten business model ideas were selected on the basis of single-component ideas (three related to value creation, four related to value delivery and 3 related to value capture) while the rest is a combination of up to seven different component ideas. Taking into account the entire sample, we generally find that the degree of change, i.e., the number of different component ideas included in a business model idea strongly correlates with both the novelty of business model ideas ($r = 0.42$, $p = 0.00$) and their value ($r = 0.50$, $p = 0.00$).

Drives of Idea Quality

Table 7 presents four regression analysis models related to the novelty and value of crowdsourced business model ideas that take into account the same contributors characteristics as used for investigating the drivers of outcome quantity.

Insert Table 7 about here

Like with outcome quantity, lead users and personal creativity are important drivers for novelty and value of crowdsourced business model innovation. In contrast to what we find in relation to outcome quantity, perceived fairness of the crowdsourcing initiative does not affect the average quality of ideas but surprisingly has a negative effect on the value of top ideas (model 4). While being a fan negatively affects the novelty of ideas, business education and business experience of contributors decrease the value of business model ideas. Prior experience with business model development, however, positively influences the development of top valuable business model ideas.

Discussion

Is crowdsourcing able to alleviate the process of business model innovation and provide novel and valuable ideas for developing or changing a firm's business model? Using data from a crowdsourcing process for generating a new podcast business model we find that, although at first glance it appears contradictory to ask users for ideas about how a firm can generate or increase its profit, crowdsourcing-based search mechanisms may indeed be capable of providing useful inputs to a firm's business model innovation process. Contributions interestingly span all basic business model dimensions, namely value creation, value delivery and value capture. Particularly interesting are the ideas submitted to innovate the value-capture aspect of the business model since there might be conflicts of interests between providers and users. In our case, several users proposed to produce two versions of the podcast, one for free including advertising, and a paid one without advertising but with bonus content. Another popular idea was to set up live recordings of the podcast where tickets could be sold. Also mentioned by several users was the possibility to create a paid mobile app that includes additional bonus material to

the podcast. Other suggestions ranged from incorporating a dating service to including different versions of product placement or to enabling direct donations by listeners.

Furthermore, we find that a substantial number of contributions provide novel ideas to four or more components of the business model, indicating that a high degree of change (vs. suggestions for new value propositions only) may be possible when applying crowdsourcing-based search processes for business model innovation. We identify lead users and personal creativity to mainly drive the degree of change in business model ideas as well as their quality in terms of novelty and value. Being a fan negatively influences both the quantity and quality of contributions. Whether or not the crowdsourcing initiative is perceived to be fair, however, has a significant positive effect on submitting business model ideas comprising of at least one, or more, suggestions for innovating individual business model components.

Our findings have important implications for managers since they may encourage them to consider opening up the business model innovation process and leverage diverse knowledge assets of crowds for reducing the uncertainties and risks involved in business model innovation. A qualitative inspection of the submitted ideas reveals that some ideas are suggested repeatedly, i.e. managers may get an indication of what many users consider novel and appropriate. Like in the case of crowdfunding (e.g. Mollick, 2013), crowdsourcing business model innovation may thus additionally contribute relevant market information and reduce the risk of losing customers with unsuccessful business model experiments. Moreover, firms who involve users in their business model innovation processes may capture the positive effects of customer empowerment on the way they are perceived in the marketplace (Fuchs and Schreier, 2011) to a substantially higher extent as compared to involving users into their new product development activities only. On the other hand, it is important that managers take into account the risks involved in soliciting participation for business model innovation, i.e. inviting crowds to redefine the entire way a firm creates, delivers and

captures value. Sufficiently addressing the expectations of the crowd in terms of fairness, selection procedures and implementation may entail considerably more serious challenges for the initiating firm as compared to what has been reported for crowdsourcing processes of product innovation (cf. Gebauer et al. 2013).

Although we could not experimentally manipulate the crowdsourcing process with respect to modularizing the problem (using the business model canvas or not) in this study, feedback from the pre-tests indicate that the business model canvas worked well for facilitating the process of crowdsourcing business model innovation. However, managers will need to take into account the lack of possibilities for displaying and addressing the dynamics and interdependencies inherent to business model innovation when processing the outcome.

Overall, our study contributes to extending existing knowledge on Open Innovation and Open Business Models (e.g., Chesbrough, 2003; Laursen and Salter, 2006b), and the role and value of using crowdsourcing as a search mechanism for accessing and leveraging knowledge inputs to innovation processes (e.g., Jeppesen and Lakhani, 2010). It specifically provides first insights into how crowds can support the process of business model innovation, and may reduce the risks involved with business model experimentation. More generally, our study also provides first insights into a case in which crowdsourcing was used for solving a highly complex problem. Further research may address this more explicitly and e.g., study how, why and under which conditions crowdsourcing may be used for complex problem solving. One particularly fruitful area for further research may be to study how the outcome of competitive settings for crowdsourcing business model innovation as selected on the basis of the contingency arguments put forward by Boudreau and Lakhani (2009) for this study differs from the outcome of a collaborative community approach in which contributors could see and build upon each other's inputs for business model innovation. Along these lines it may also be interesting to investigate the effects of involving existing vs.

potential new user or customer groups in the crowdsourcing process for business model innovation on the potential to derive radical business model change (cf. Christensen 1997). In our case we found that for example, one user suggested running the podcast in English, a suggestion that was clearly not expected to emerge from the existing user group of Swedish listeners. It is interesting to note that exactly this idea was implemented – Filip and Frederik now speak English and have less focus on Sweden with regards to their topics.

Related to the generalizability of our findings it is clear that our results are based on only one case study. Thus, future research is encouraged to conduct similar tests in different settings in order to gain a deeper understanding of the merits of crowdsourcing business model innovation, or more generally, complex problem solving. Of course, it is not expected that crowdsourcing will produce novel and valuable outcome for any business model innovation effort. The generalizability of our results may furthermore be limited by the small size of the organization behind Filip and Fredrik's podcast and the lack of technology investments necessary to produce a podcast. Many barriers to business model experimentation found in other industries are not present in the podcast industry. However, the results of this case study suggest that involving crowds in the processes of business model innovation and, maybe even more generally, strategy making may be useful as a complementary means of generating inputs, and that it might be valuable to study relevant contingency factors in future research. Finally, it is worth noting that some of the ideas that emerged in the crowdsourcing process for a new podcast business model have already been implemented by Filip and Frederik. Amongst others, the implemented changes include several improvements to the customer relationship component, as for example an official Twitter hashtag for the podcast and more social media activity by Filip and Fredrik.

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Tables

Table 1. Degree of business model change in submissions

Number of updated business model components (0-8)	Frequency	Percent	Type of contribution
0	149	35.64	Group 1: Status quo (149)
1	77	18.42	Group 2: Improvement (181)
2	52	12.44	
3	52	12.44	
4	33	7.89	Group 3: Innovation (88)
5	31	7.42	
6	17	4.07	
7	5	1.20	
8	2	0.48	
Total	418	100	

Table 2. Distribution of submissions among business model components

Components	N	Percent	Group	Dimension
Value proposition	139	17.89	Product (139)	Value creation (378)
Key resources/activities	119	15.32	Infrastructure (239)	
Key partnerships	120	15.44		
Customer relationship	95	12.23	Customer Relationship (200)	Value delivery (200)
Customer segments	43	5.53		
Channels	62	7.98		
Revenue streams	97	12.48	Revenue Model (199)	Value capture (199)
Cost structure	102	13.13		
Total	777	100		

Table 3. Degree of change related to main business model dimensions

Degree of change	Number of business model ideas	Number of individual component ideas	Value creation	Value delivery	Value capture
1	77	77	48 (62.3%)	21 (27.3%)	8 (10.4%)
2	52	104	56 (53.8%)	31 (29.8%)	17 (16.3%)
3	52	156	75 (48.1%)	37 (23.7%)	44 (28.2%)
4	33	132	59 (44.7%)	35 (26.5%)	38 (28.8%)
5	31	155	74 (47.7%)	34 (21.9%)	47 (30.3%)
6	17	102	45 (44.1%)	26 (25.5%)	31 (30.4%)
7	5	35	15 (42.9%)	10 (28.6%)	10 (28.6%)
8	2	16	6 (37.5%)	6 (37.5%)	4 (25.0%)
Total	269	777			

Table 4. Characteristics of submitters vs. non-submitters

Contributor characteristics	Mean (Submitters)	Mean (Non-submitters)	p^a
Lead userness	2.79	2.91	0.14
Personal creativity	4.11	4.05	0.26
Perceived fairness	3.84	4.04	0.01
Being a fan	4.52	4.43	0.32
Business knowledge	2.41	2.60	0.12
Product knowledge	2.31	2.37	0.63
Business experience	0.79	1.40	0.07
Business model experience	0.56	0.55	0.97
Founding experience	0.22	0.30	0.26
Business education	0.25	0.26	0.73 ^d
Listening frequency	0.93	0.94	0.88 ^d
Industry experience	0.03	0.05	0.48 ^d
Age	25.56	26.45	0.20

$N = 418$, ^a two-sample t-test, ^d Chi-square test

Table 5. Contributor characteristics subject to main business model dimensions

Variables	Value creation			Value delivery			Value capture		
	0 ^a	1 ^b	<i>p</i> ^c	0	1	<i>p</i>	0	1	<i>p</i>
Lead_userness	2.80	2.92	0.09	2.80	2.98	0.02	2.77	3.05	0.00
Personal creativity	4.06	4.26	0.01	4.12	4.25	0.10	4.10	4.30	0.01
Perceived fairness	3.86	4.07	0.00	3.96	4.00	0.55	3.89	4.14	0.00
Being a fan	4.52	4.40	0.18	4.45	4.48	0.70	4.50	4.39	0.23
Business knowledge	2.45	2.61	0.15	2.44	2.70	0.03	2.43	2.74	0.01
Product knowledge	2.30	2.39	0.49	2.28	2.47	0.14	2.28	2.49	0.11
Business experience	0.90	1.43	0.11	1.16	1.23	0.83	1.01	1.52	0.14
Business model experience	0.54	0.57	0.85	0.52	0.62	0.55	0.45	0.76	0.07
Founding experience	0.22	0.31	0.14	0.26	0.29	0.56	0.20	0.41	0.00
Business education	0.23	0.28	0.30 ^d	0.26	0.26	0.94 ^d	0.26	0.25	0.87 ^d
Listening frequency	0.93	0.94	0.52 ^d	0.95	0.92	0.23 ^d	0.93	0.94	0.94 ^d
Industry experience	0.04	0.05	0.54 ^d	0.04	0.05	0.89 ^d	0.04	0.06	0.34 ^d

N = 418, two-sample t-test

^a mean value if no idea was submitted to this business model dimension

^b mean value if an idea was submitted to this business model dimension

^c t-Test

^d Chi-square test

Table 6. Contributor characteristics' influence on idea submission

VARIABLES	(1) Submission of idea Logit	(2) Degree of change OLS	(3) Degree of change Ordered Probit
Lead userness	0.183 (0.170)	0.367** (0.146)	0.186** (0.083)
Personal creativity	0.103 (0.156)	0.355** (0.137)	0.185** (0.079)
Perceived fairness	0.468*** (0.156)	0.300** (0.133)	0.211*** (0.077)
Being a fan	-0.268* (0.140)	-0.261** (0.116)	-0.163** (0.066)
Business knowledge	0.127 (0.125)	0.142 (0.109)	0.094 (0.062)
Business education (d)	-0.033 (0.292)	-0.021 (0.248)	-0.029 (0.140)
Product knowledge (d)	-0.037 (0.098)	0.039 (0.085)	0.018 (0.049)
Business experience	0.060 (0.055)	0.004 (0.036)	0.004 (0.020)
Business m. experience	-0.181** (0.088)	-0.007 (0.072)	-0.019 (0.041)
Founding experience	0.179 (0.229)	0.192 (0.184)	0.093 (0.103)
Listening frequency	-0.013 (0.454)	-0.069 (0.394)	-0.044 (0.224)
Industry experience	0.554 (0.596)	0.013 (0.482)	0.045 (0.271)
Age	0.040* (0.024)	0.006 (0.020)	0.008 (0.011)
Gender	-0.101 (0.288)	-0.039 (0.253)	-0.031 (0.145)
Occupation dummies	YES	YES	YES
Education dummies	YES	YES	YES
Constant	-1.634 (1.462)	-0.964 (1.241)	
Observations	418	418	418
R-squared		0.124	
Chi ² Test	0.063	0.000	0.000
Log-likelihood	-256.419	-845.608	-727.344

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.10

Table 7. Contributor characteristics' influence on idea quality

VARIABLES	(1) Novelty OLS	(2) Value OLS	(3) Top novelty ^a Logit	(4) Top value ^a Logit
Lead userness	0.122** (0.061)	0.220** (0.102)	0.638** (0.295)	-0.120 (0.287)
Personal creativity	0.099* (0.056)	0.202** (0.093)	0.371 (0.296)	0.542* (0.280)
Perceived fairness	0.043 (0.056)	0.011 (0.094)	-0.110 (0.259)	-0.443* (0.250)
Being a fan	-0.079* (0.046)	-0.056 (0.076)	-0.411** (0.199)	0.082 (0.211)
Business knowledge	0.044 (0.046)	-0.007 (0.077)	0.031 (0.216)	0.144 (0.205)
Business education (d)	-0.151 (0.101)	0.022 (0.168)	-0.549 (0.504)	-0.978* (0.537)
Product knowledge (d)	-0.038 (0.037)	-0.077 (0.061)	0.050 (0.166)	-0.054 (0.165)
Business experience	-0.015 (0.013)	-0.013 (0.022)	-0.080 (0.078)	-0.305** (0.131)
Business m. experience	0.028 (0.032)	0.029 (0.053)	0.077 (0.140)	0.349** (0.164)
Founding experience	0.015 (0.074)	-0.104 (0.123)	0.108 (0.324)	-0.325 (0.371)
Listening frequency	-0.058 (0.165)	0.016 (0.273)	-0.442 (0.677)	0.025 (0.790)
Industry experience	0.142 (0.192)	0.234 (0.319)	0.353 (0.814)	0.348 (0.831)
Age	-0.003 (0.008)	-0.008 (0.013)	-0.026 (0.036)	0.000 (0.035)
Gender	0.061 (0.108)	0.105 (0.180)	0.078 (0.527)	-0.602 (0.563)
Occupation dummies	YES	YES	YES	YES
Education dummies	YES	YES	YES	YES
Constant	1.084** (0.519)	1.341 (0.862)	-1.010 (2.627)	-0.052 (2.562)
Observations	269	269	258	258
R-squared	0.111	0.099		
Chi ² Test	0.087	0.176	0.044	0.036
Log-likelihood	-239.378	-375.642	-103.425	-109.051

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.10

^a Top 20 percent of the novelty/value distribution

Appendix

Table A1: Sample ideas (preliminarily translated from Swedish to English)

Sample idea 1
Value proposition: An interactive segment where listeners are allowed to be part of the experience through a mix of reactive and proactive discussions based on user-generated content.
Activities & resources: The creation and the administration of a forum or a channel for the exchange and processing of interesting ideas, topics or concepts for the podcast.
Customer segments: I am satisfied with the current approach
Key partnerships: Depending on the above, sponsorships and new ideas lead to live podcasts recorded out there perhaps at companies or other events.
Customer relationship: See above
Channels: See above
Cost structure: A "producer-cost"
Revenue mechanism: Through multiple and dynamic channels a larger portion of the revenue source could come from project sponsorship contracts, product placement and commercial spots adjacent to the new distribution channels.
Sample idea 2:
Value proposition: I would like to hear an annotated version of a previous podcast, type as DVD comment section. A section where you tell a little more about the people you are mentioning in the podcast.
Activities & resources: I am satisfied with the current approach
Customer segments: I am satisfied with the current approach
Key partnerships: I am satisfied with the current approach
Customer relationship: I am satisfied with the current approach
Channels: Why do not you send the pod in the radio too? Tex P3 or any other radio station. By the way, why isn't there a radio station that only broadcasts Podcasts?
Cost structure: I am satisfied with the current approach
Revenue mechanism: I am satisfied with the current approach

Sample idea 3:
Value proposition: F & F was "groundbreaking" when they launched - it was a completely new concept in Sweden with such a podcast. Now I also think it worked well to primarily Fredrik (but also Filip) had a giant treasure of stories, books, movies and anecdotes to tell of. Now it feels a bit like the tax has run out. But at the same time the whole concept feels a little "done", I think you should go in a new direction and break new ground elsewhere instead of digging where all others now stands. Their great strength is that they have a tremendous knowledge of American and Swedish celebrities, I think that is a strength we should build on. What I would think would be *awesome* fun is if they could live-comment on various events like Ricky Gervais has done. Will such Melodifestivalen, crystal etc etc but can just as well be foreign (Oscars) as Swedish. Think it would be crazy fun to watch Crystal Gala and have F & F comment on it. There are different apps that would work great for this. Ang business model SVT should pay for this, because then maybe it ends up looking at the Eurovision Song Contest again .. :) But jokes aside - I definitely think the service should be financed through advertising. In addition to this, I have another idea in a completely different direction to make money. It may sound a bit crazy, but bear with me. I think F & F should start a dating service (I told you it was a crazy idea). Match.com and the like have long been dominant, but now it's getting a lot less. Dating sites that are niche for Instagram users, indie music geeks, for truckers, etc., etc. Why not a dating for F & Fs listeners? Can imagine that there is a certain community of the F & Fs listeners and many would think it would be fun to meet someone else who is listening (as a little bonus, we of course also something in common to talk about on a first date :)) Dating is of course also a bizarre profitable market. Definitely think this is a premium service where users pay per month. F & F might tillochmed highlights one single in each program and gives some questions to them etc etc. (Would also like to point out that I myself am happily married so I do not do this for personal gain, but only because it is a business myself long had to start niche dejtningssajer after seeing how very money match.com serve. If it This is something that F & F would be interested in is worth, I want to be part of building the service).
Activities & resources: see first post
Customer segments: I am satisfied with the current approach
Key partnerships: Feels reasonable to throw out the SBS media if they do not manage to sell advertising to it ..
Customer relationship: I am satisfied with the current approach
Channels: I am satisfied with the current approach
Cost structure: see first post
Revenue mechanism: I think it must be advertising, or dating concept

Sample idea 4:
Value proposition: I am satisfied with the current approach
Activities & resources: I am satisfied with the current approach
Customer segments: I am satisfied with the current approach
Key partnerships: I think they should sell each section via an app. 1-5kr per episode. The sections could then be released only two or three days later through the existing channels. If you are not prepared to pay 1-5kr for an episode, you deserve not to listen!
Customer relationship: I am satisfied with the current approach

Channels: I think also the crowd who choose to subscribe / pay to get to feel a little exclusive and that they are "close" Filip and Fredrik show through unique offers just for them.
Cost structure: Cost to anyone who programs the App. A certain % to Apple / App store Continued cost for cutting and editing.
Revenue mechanism: They can continue with funding from advertisers but also by charging for sections. Let's say 25,000 listeners want to listen to the program immediately released and 3kr pay for it. It would give 75000: - a week.

Sample idea 5:
Value proposition: Bring in suggestions from listeners about what they would like to hear more about. Short interview with a funny character. They could take tips from listeners to find interesting characters. What I like most about F & F is not just their conversations with each other, but also their awesome way to interview non-famous people.
Activities & resources: Use filipchfredrik.com and Facebook page to catch up on suggestions and listen to what the audience likes the most. This will maximize the experience for the listeners.
Customer segments: I am satisfied with the current approach
Key partnerships: Instead of the boring trend of sponsored podcasts "Thank you, If you for making this possible" Sell packages to businesses, like the life recording from the Spotify office: F & F is recording the podcast at a company, employees can sit and have an exclusive experience. In this way it is advertising for the company but F & F delivers more value back by making it an event for employees, then they can also charge more for the package than for a traditional sponsorship.
Customer relationship: I am satisfied with the current approach
Channels: I am satisfied with the current approach
Cost structure: Possible travel expenses, but get the company to pay for if they want to get their F & F.
Revenue mechanism: Businesses pay, but they also get something very clear back. Experience for employees, their names read out in Sweden's largest podcast and thus both credd and media presence.

Sample idea 6:
Value proposition: To reach further out and also search for small sidekicks then "people" included more in the podcast. When the focus is often on the Swedes and their habits / culture etc so should also be provided with hints / interviews from other places in Sweden / world. Filip & Fredrik can use their own kind of selected correspondents (guest player or solid) that reports from various celebrations, events and so on. It may be eg. Scandinavian Midsummer celebrations in Greece. Or from a "Swedish" city in the United States. In Sweden, this works at events / concerts / protests etc. Let people show / discuss / be interviewed by telephone. Goes one step further, even local radio stations participate and contribute broadcasts / recordings.
Activities & resources: The same approach, but a little more "Call so we listen to" feel where the interviewee is first allowed to take place and then the F & F (Filip & Fredrik) elaborate on the interview. What is it that makes this event so magical / exciting / strange etc. Captures the essence of why the Swedes and their behavior when they are out of their normal territory.
Customer segments: I am satisfied with the current approach

Key partnerships: This will be out on local radio stations live while the podcast is recorded on ordinary place. Marketed through social media. The alternative: F & F go out with the live broadcast (portable TV studio?) Themselves and ship via the web with their guests in the studio.
Customer relationship: The homepage of web TV shows past and all finished podcasts / broadcasts in cooperation with good organizations that do good (Children's Cancer Foundation, UNICEF or the like.) And where part of the proceeds of podcasts / downloads goes to them.
Channels: Spotify website.
Cost structure: Adding up the website and wages. In addition, doing the podcast DIY style, unlike your TV shows, would be alright. People are sick of polished.
Revenue mechanism: I am satisfied with the current approach

Table A2. Combinations of individual business model component ideas

Value proposition	Customer relationship	Customer segments	Channels	Resources/ Activities	Partnerships	Revenue streams	Cost structure	Freq.	Percent
0	0	0	0	0	0	0	0	149	35,65
1	0	0	0	0	0	0	0	24	5,74
0	0	0	0	1	0	0	0	13	3,11
0	1	0	0	0	0	0	0	12	2,87
0	0	0	0	0	1	0	0	11	2,63
1	0	0	0	1	0	0	0	9	2,15
0	0	0	0	0	0	0	1	8	1,91
0	1	0	0	1	0	0	0	7	1,67
0	0	1	0	0	0	0	0	6	1,44
1	0	0	0	1	1	1	1	6	1,44
1	1	0	0	1	1	1	1	6	1,44
0	0	1	0	0	1	1	0	4	0,96
1	0	0	0	0	0	1	0	4	0,96
1	0	0	0	1	0	1	0	4	0,96
1	1	0	0	1	0	0	0	4	0,96
0	0	0	0	0	1	1	1	3	0,72
0	0	0	0	1	0	1	1	3	0,72
0	0	0	1	0	0	0	0	3	0,72
0	0	0	1	0	0	1	0	3	0,72
0	0	0	1	0	1	0	0	3	0,72
0	1	0	0	0	0	1	0	3	0,72
0	1	0	0	1	0	0	1	3	0,72
1	0	0	0	0	1	0	0	3	0,72
1	0	0	0	1	1	0	1	3	0,72
1	0	0	0	1	1	1	0	3	0,72
1	0	1	0	1	1	1	0	3	0,72
1	1	0	0	0	1	0	0	3	0,72
1	1	0	0	1	0	1	1	3	0,72
1	1	0	0	1	1	0	0	3	0,72
0	0	0	0	0	1	0	1	2	0,48
0	0	0	1	0	1	1	1	2	0,48
0	0	0	1	1	0	0	0	2	0,48
0	0	1	0	0	1	0	0	2	0,48
0	1	0	0	0	1	0	1	2	0,48
0	1	0	0	0	1	1	1	2	0,48
1	0	0	0	0	0	0	1	2	0,48
1	0	0	0	0	1	1	0	2	0,48
1	0	0	1	1	0	0	0	2	0,48
1	0	0	1	1	0	1	1	2	0,48
1	0	0	1	1	1	0	1	2	0,48
1	0	0	1	1	1	1	1	2	0,48
1	1	0	0	0	1	1	1	2	0,48
1	1	0	1	1	0	1	0	2	0,48
1	1	0	1	1	1	1	0	2	0,48
1	1	1	0	1	1	0	0	2	0,48
1	1	1	1	1	1	1	1	2	0,48
0	0	0	0	0	0	1	1	1	0,24
0	0	0	0	0	1	1	0	1	0,24
0	0	0	0	1	1	0	0	1	0,24
0	0	0	0	1	1	0	1	1	0,24
0	0	0	0	1	1	1	0	1	0,24
0	0	0	0	1	1	1	1	1	0,24
0	0	0	1	0	0	0	1	1	0,24
0	0	0	1	0	1	0	1	1	0,24

[illegible]

Table A3 - Part 1. Contributor characteristics subject to individual business model components

Variables	Value proposition			Customer relationship			Customer segments			Channels		
	0 ^a	1 ^b	<i>p</i> ^c	0	1	<i>p</i>	0	1	<i>p</i>	0	1	<i>p</i>
Lead userness	2.80	2.99	0.01	2.79	3.11	0.00	2.86	2.97	0.35	2.85	2.95	0.35
Personal creativity	4.10	4.31	0.01	4.11	4.37	0.00	4.16	4.26	0.39	4.16	4.20	0.74
Perceived fairness	3.91	4.09	0.02	3.95	4.05	0.29	3.99	3.80	0.12	3.97	4.01	0.66
Being a fan	4.47	4.44	0.74	4.45	4.49	0.65	4.47	4.33	0.29	4.46	4.45	0.94
Business knowledge	2.46	2.69	0.07	2.43	2.89	0.00	2.51	2.71	0.30	2.50	2.72	0.20
Product knowledge	2.32	2.41	0.49	2.28	2.59	0.04	2.32	2.63	0.13	2.31	2.60	0.10
Business experience	0.93	1.69	0.03	1.24	0.98	0.50	1.05	2.38	0.01	1.25	0.83	0.36
Business model experience	0.50	0.66	0.34	0.50	0.72	0.27	0.53	0.72	0.48	0.53	0.71	0.42
Founding experience	0.22	0.38	0.01	0.26	0.32	0.44	0.25	0.42	0.12	0.27	0.29	0.80
Business education	0.25	0.27	0.80 ^d	0.26	0.26	0.90 ^d	0.26	0.23	0.68 ^d	0.25	0.29	0.53 ^d
Listening frequency	0.94	0.94	0.99 ^d	0.94	0.92	0.38 ^d	0.94	0.93	0.88 ^d	0.94	0.89	0.09 ^d
Industry experience	0.04	0.06	0.30 ^d	0.04	0.05	0.60 ^d	0.05	0.02	0.50 ^d	0.05	0.02	0.26 ^d

N = 418, two-sample t-test

^a mean value if no idea was submitted to this business model dimension

^b mean value if an idea was submitted to this business model dimension

^c t-Test.

^d Chi-square test

Table A3 - Part 2. Contributor characteristics subject to individual business model components.

Variables	Resources/ Activities			Key partnerships			Revenue streams			Cost structure		
	0	1	<i>p</i>	0	1	<i>p</i>	0	1	<i>p</i>	0	1	<i>p</i>
Lead userness	2.80	3.04	0.00	2.80	3.04	0.00	2.80	3.08	0.00	2.78	3.12	0.00
Personal creativity	4.08	4.40	0.00	4.12	4.30	0.02	4.12	4.34	0.01	4.11	4.35	0.00
Perceived fairness	3.94	4.06	0.16	3.92	4.10	0.03	3.94	4.10	0.06	3.93	4.12	0.02
Being a fan	4.49	4.38	0.23	4.47	4.44	0.79	4.49	4.37	0.26	4.50	4.32	0.07
Business knowledge	2.42	2.82	0.00	2.45	2.76	0.02	2.44	2.85	0.00	2.45	2.80	0.01
Product knowledge	2.30	2.46	0.25	2.29	2.50	0.13	2.30	2.41	0.17	2.27	2.60	0.02
Business experience	1.00	1.65	0.07	1.09	1.43	0.33	1.08	1.52	0.26	1.04	1.64	0.11
Business model experience	0.48	0.73	0.16	0.45	0.80	0.05	0.42	0.98	0.00	0.46	0.82	0.06
Founding experience	0.23	0.36	0.07	0.23	0.37	0.06	0.21	0.45	0.00	0.23	0.40	0.02
Business education	0.23	0.34	0.02 ^d	0.25	0.28	0.46 ^d	0.26	0.26	0.99 ^d	0.25	0.29	0.34 ^d
Listening frequency	0.94	0.92	0.56 ^d	0.94	0.93	0.58 ^d	0.93	0.94	0.90 ^d	0.94	0.93	0.85 ^d
Industry experience	0.04	0.05	0.64 ^d	0.04	0.06	0.33 ^d	0.04	0.05	0.64 ^d	0.04	0.06	0.37 ^d

N = 418, two-sample t-test

^a mean value if no idea was submitted to this business model dimension

^b mean value if an idea was submitted to this business model dimension

^c t-Test.

^d Chi-square test

Table A4. Correlations ($N = 418$)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1 Proposal (d)	1															
2 Degree of change	0.71***	1														
3 Lead usersness	0,07	0.23***	1													
4 Personal creativity	0,06	0.20***	0.29***	1												
5 Perceived fairness	0.13**	0.12*	0,09	0.15**	1											
6 Being a fan	-0,05	-0,06	0.13**	0,08	0.31***	1										
7 Business knowledge	0,08	0.20***	0.34***	0.26***	0,06	-0,01	1									
8 Business education (d)	0,02	0,05	0,03	-0,03	0,02	-0,04	0.43***	1								
9 Product knowledge (d)	0,02	0.13*	0.38***	0.13*	0,07	0,09	0.33***	0	1							
10 Business experience	0,09	0,09	0.12*	0,00	-0,02	-0,07	0.26***	0.13*	0,03	1						
11 BM experience	0,00	0.12*	0.23***	0.15**	0,03	-0,05	0.34***	0.16***	0,05	0.39***	1					
12 Founding experience	0,06	0.15**	0.23***	0.14**	-0,06	-0.15**	0.34***	0,06	0.10*	0.30***	0.51***	1				
13 Listening frequency	0,01	-0,04	-0.11*	-0,07	0,09	0.12*	-0,07	-0,04	0,03	-0,04	-0.15**	-0,07	1			
14 Industry experience	0,03	0,03	0.10*	0,00	0,00	0,04	0.12*	-0,07	0.15**	0.16**	0.13**	0.15**	0,06	1		
15 Age	0,06	0,05	0,04	-0,07	-0.19***	-0.20***	0,02	-0,03	-0.11*	0.51***	0.27***	0.27***	-0,02	0,08	1	
16 Gender (d)	-0,04	-0,04	-0,08	-0,02	0,00	0,07	-0.15**	-0,04	0.14**	0,02	-0,02	-0,02	-0.14**	0	-0,03	1

$N = 418$; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (two-sided)

Table A5. Correlations ($N = 269$)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1 Novelty	1															
2 Value	0.77***	1														
3 Lead usersness	0.19**	0.15*	1													
4 Personal creativity	0.20**	0.20**	0.29***	1												
5 Perceived fairness	0.03	0.02	0.09	0.1	1											
6 Being a fan	-0.07	-0.02	0.13**	0.11	0.27***	1										
7 Business knowledge	0.12*	0.05	0.34***	0.21***	0	-0.02	1									
8 Business education (d)	-0.07	-0.01	0.03	-0.03	0.09	-0.01	0.40***	1								
9 Product knowledge (d)	0.03	-0.01	0.38***	0.12	0.04	0.04	0.30***	-0.05	1							
10 Business experience	-0.01	-0.04	0.12*	-0.02	-0.02	-0.06	0.29***	0.13*	0	1						
11 BM experience	0.14*	0.05	0.23***	0.11	-0.02	-0.05	0.37***	0.14*	0.05	0.40***	1					
12 Founding experience	0.13*	0.02	0.23***	0.12	-0.04	-0.04	0.38***	0.01	0.13*	0.31***	0.58***	1				
13 Listening frequency	-0.07	-0.03	-0.11*	-0.06	0.03	0.04	-0.11	-0.05	0.03	-0.07	-	-0.06	1			
14 Industry experience	0.07	0.04	0.10*	-0.07	0.01	0.01	0.12*	-0.06	0.16**	0.19**	0.12*	0.20***	0.06	1		
15 Age	-0.02	-0.06	0.04	-0.09	-	-0.17**	0.09	-0.02	-0.07	0.54***	0.33***	0.31***	-0.01	0.11	1	
16 Gender (d)	0.01	0.02	-0.08	-0.01	0.01	0.06	-0.15*	0.01	-0.14*	0.03	-0.04	0	-0.17**	0.04	-0.01	1

$N = 269$; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (two-sided)

CHAPTER 4: BUSINESS MODEL EXPERIMENTATION IN THE RECORDED MUSIC INDUSTRY: VALUE BEYOND MUSIC

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Abstract

This article suggests that business model experiments in the recorded music industry can be successful when recorded music is offered as a promotional product – either for free or at very low cost – and bundled with more lucrative value-added elements that provide personalised and unique value beyond the music. In the value-added model, the universal access to music is taken for granted, but as such, will neither create significant value nor contribute a considerable stream of revenue. Therefore, the value-added products are necessary to create a new kind of value and close the monetisation gap left by the falling sales of recorded music. The empirical evidence in this article is based on information acquired through three case studies and three in-depth interviews with industry professionals.

Keywords: business model; business model innovation; music industry; value

Introduction

Research focusing on business models is a relatively young domain that first became popular at the end of the '90s. This is largely due to the advent of the Internet and its massive adoption for e-commerce Demil and Lecocq, 2010. Changes in information and communication technologies have prompted firms to reorganize the way they do business; such changes are reflected in a firm's business model. Since the end of the '90s the number of publications on the matter has steadily increased Zott *et al.*, 2011.

In a recent review of studies using the business model concept, Lambert and Davidson 2013 identified the information, media, and telecommunications industry as the most prominently analysed sector. Business models in the recorded music industry have been the focus of several studies: Vaccaro & Cohn 2004; Moyon & Lecocq 2010; Hougaard & Tvede 2010; and Waldner, Zisfkovits, & Heidenberger 2013. Furthermore, in much of the literature on business models, the recorded music industry serves as a prime example George and Bock, 2011; Giesen *et al.*, 2010; Osterwalder and Pigneur, 2010; Zott and Amit, 2010. The rise of Apple, with its iPod/iTunes business model, is probably the most frequently used example of the relevance of business models in general. Case studies from the recorded music industry are frequently used to argue the need for business model experimentation and innovation, especially in mature industries Chesbrough, 2010; Osterwalder and Pigneur, 2010.

What makes the recorded music industry attractive for business model research? The ways in which music is produced, delivered, and consumed have fundamentally changed through digitization Tschmuck, 2012. With traditional business models based on physical goods, it has become impossible to maintain pre-Internet profits Liebowitz, 2006; Michel, 2006; Oberholzer-Gee and Strumpf, 2007. This situation has compelled incumbents in the recorded music industry to completely re-evaluate their business models. They are forced to find new ways to turn the technological advances affecting

the production, distribution, and consumption of recorded music into profits in order to replace dropping revenues from their traditional business models.

Typically, when new technologies emerge or other shifts that relax constraints on business models occur, traditional models come under pressure and opportunities for new models emerge McGrath, 2010. Several authors suggest that business model experimentation is crucial to finding new ways to create, deliver, and capture value for industries (e.g., Baden-Fuller and Morgan, 2010; Chesbrough, 2007, 2010; McGrath, 2010. The aim of this article is to shed light on a particular business model experiment underway in the recorded music industry. More precisely, the paper addresses the following question: Is it feasible to offer recorded music as a promotional product, either for free or at very low cost, and bundle it with more lucrative value-added elements associated with the artist and the recording? This question is addressed using qualitative research methods, specifically with three case studies of business model experiments and three in-depth interviews with industry professionals.

The remainder of this article is organised as follows: Section 2 reviews the theoretical background on business models in general and business model experimentation; Section 3 discusses the research objective and methodology; Section 4 presents three case studies of successful artist-driven business model experiments in the recorded music industry; Section 5 enhances the findings of Section 4 with in-depth interviews ; conclusions and suggestions for further research are presented in Section 6.

Literature review

BUSINESS MODELS

The business model has become a new unit of analysis in management and economics that is distinct from product, firm, industry, or network Zott *et al.*, 2011. There are several reasons for the growing interest in business models: (1) the advent of the Internet Amit and Zott, 2001, (2) rapid growth in emerging markets Thompson and

MacMillan, 2010, and (3) expanding industries dependent on post-industrial technologies such as software or biomedicine Perkmann and Spicer, 2010. Although business models have only been explicitly in the public consciousness for the last decade, they have been relevant to economic behaviour since pre-classical times Teece, 2010.

Despite the overall surge in literature, there is still no common and widely accepted definition of what a business model is Desyllas and Sako, 2013. Potential reasons for this lack of a common definition include the following: (1) the development of the topic in isolated silos Zott *et al.*, 2011, (2) its simultaneous consideration of process and content Chesbrough and Rosenbloom, 2002, and (3) its unclear relationship with a firm's strategy Casadesus-Masanell and Ricart, 2010. However, there seems to be some consensus among scholars that a business model, at its core, describes the design of a firm's value creation, delivery, and capture mechanisms Zott *et al.*, 2011. The following scholars have defined business models with a focus on the value creation aspect: Amit & Zott 2001; Chesbrough & Rosenbloom 2002; Morris, Schindehutte, & Allen 2005; Teece 2010; and George & Bock 2011. Conceptualizations of business models range from activity systems Zott and Amit, 2010 to more concrete component models that reflect the required elements – e.g., value proposition, revenue model, value network, and resources – that define how the value creation operates. Examples of such component models are presented, for instance, in Afuah & Tucci 2001; Chesbrough & Rosenbloom 2002; Johnson, Christensen, & Kagermann 2008; Osterwalder, Pigneur, & Tucci 2001; Chesbrough and Rosenbloom, 2002; Johnson *et al.*, 2008; 2005.

In their review of literature on business models, Zott et al. 2011 revealed that – besides being used for e-business and strategic issues – the business model has been employed to address issues of innovation management. Business model innovation has been identified as a highly promising approach for tackling the challenges imposed by changing sources of value creation in times of high environmental volatility Pohle and

Chapman, 2006. Innovating a business model is different from innovating a product – or a process. Innovating a business model involves changing the entire activity system, and therefore involves a larger number of stakeholders Zott and Amit, 2010.

Markides 2006 suggests that business model innovations tend to be disruptive to established competitors. In his initial theory of disruptive innovation, Christensen suggested that disruptive innovations overtake the old technology and make the existing products obsolete Christensen, 1997a. More recent literature, however, states that disruptive business model innovations may grow a businesses very quickly to a certain point, but hardly ever manage to overtake the market completely Markides, 2006. Therefore, new business models rarely destroy old ones, but rather deflate their profit potential Hamel, 2002.

BUSINESS MODEL EXPERIMENTATION

When an industry is struck by disruptive changes, the constraints of the previously dominant business model are lifted and new models start to emerge McGrath, 2010. The Internet, especially, has notoriously broken many old constraints on how to create, deliver, and capture value Teece, 2010. In the case of technological innovations, disruption accelerates an era of ferment that lasts until a dominant design is established again Tushman and Murmann, 1998. In most cases, it is impossible to ascertain ahead of time which new technology will supplant the old. The same can be said for business model breakthroughs. Therefore, McGrath, 2010 argues, only business model experimentation will help to discover the most effective models.

Sinfield et al. 2012 describe business model experimentation as “a means to explore alternative value creation approaches quickly, inexpensively and, to the extent possible, through thought experiments.” Treating a business model as a variable and not a constant, firms can examine multiple alternative business models, allowing them to anticipate, adjust to, and capitalise on new disruptive innovations and customer insights

Sinfield *et al.*, 2012. Business model experimentation is seen as a potent source of competitive advantage McGrath, 2010. Surprisingly, few organisations have managed to successfully plan and implement a business model that would be considered significantly different from their current business model – and even fewer have succeeded more than once Sinfield *et al.*, 2012.

Established organisations face a conflict, since experimenting with emerging business models would require changes in the current models, which have evolved over time and been proven to work Christensen and Raynor, 2003. Chesbrough 2010 argues that there are powerful cognitive barriers to business model experimentation. Organisations tend to look for information that fits with their current business logic and forgo information that conflicts with it. Not to mention that emergent opportunities may lack enough data to justify investment in them, causing them to be ignored. Chesbrough further proposes a change in leadership, as well as experimentation and effectuation, to overcome these barriers Chesbrough, 2010.

Methodology

The objective of this research is to test if successful business model experiments can be based on offering recorded music as a promotional product, either for free or at low cost, and bundling it with more lucrative, value-added elements associated with the artist and the recording. The analysis focused on two particular components of business models, namely value proposition and revenue model. There were two reasons for this focus. First, these two components are the core of a business model. Business model innovation is essentially based on the ability to develop new mechanisms to create value and derive revenues Osterwalder and Pigneur, 2010. Second, both components – value proposition and revenue model – are found in the most popular business model frameworks Johnson, 2010; Johnson *et al.*, 2008; Osterwalder and Pigneur, 2010. Even

though the analysis is limited to artist-driven business model experiments, the results are beneficial to all actors in the recorded music industry.

Strauss and Corbin 1990 claim that qualitative research methods are appropriate when the research seeks to evoke new understanding of a phenomenon in which little is yet known. In contrast to quantitative studies, qualitative research puts emphasis on the qualities of entities and on processes and meanings that are not experimentally examined or measured in terms of quantity Denzin and Lincoln, 1994. The empirical evidence of this study is comprised of three case studies and three in-depth interviews. The use of multiple sources and methods not only aids in gaining an in-depth understanding of the phenomenon in question Denzin and Lincoln, 2011, but it also adds to the study's credibility and trustworthiness Yin, 2010 and, therefore, improves the validity and reliability of the research findings Golafshani, 2003.

Each of the three case studies describes one artist-driven business model experiment in the recorded music industry. The studied experiments were conducted in 2007, 2009, and 2012 by Radiohead (*In Rainbows*), Trent Reznor (*Ghosts I-IV*), and Amanda Palmer (*Theatre is Evil*), respectively. The case study subjects were chosen based on purposive sampling. Purposive sampling is a non-probability sampling method that is primarily used in qualitative studies to select units based on specific purposes associated with answering a research study's questions or hypotheses Teddlie and Yu, 2007. The material for the case studies was gathered from a variety of sources, including academic journals, books, news articles, and blog posts³. As Eisenhardt 1989 recommends, we first examined each case individually to become familiar with it as a stand-alone entity, and then we compared the cases to explore emerging patterns.

The in-depth interviews were conducted with three industry professionals and took place in January 2013. The interviewees were selected based on convenience sampling Teddlie and Yu, 2007. The respondents represented different areas of the

³ A list of all newspaper articles and blogposts used is in Appendix A

recorded music industry and, therefore, provided a wide perspective on the research topic. The first interview was conducted with Mr. Pöyhönen, an independent artist who, at the time of writing, had recently finished crowdfunding his newest album (Bel Vel) online. The second interview was conducted with Mr. Pereira, the owner of a London-based independent record company, How The Other Half Lives. The third interview was conducted with Mr. Smith⁴, the sales director for a major music streaming service. The interviews followed a semi-structured thematic interview guideline, and the transcriptions were analysed using the inductive content analysis method as described by Elo and Kyngäs 2008.

Case studies

The following cases describe three artist-driven business model experiments that challenged the conventional methods of creating value and deriving revenues in the recorded music industry. Initially, we approach the cases separately and provide the outcomes of each experiment. Then we cross-analyse the cases and report the emerging patterns.

RADIOHEAD: IN RAINBOWS

Radiohead is an English rock band that formed in 1985. In 2003, after the release of Radiohead's sixth studio album, the band's contract with their long-time record company, EMI, expired. The two parties failed to agree on new terms and the band members decided to continue on their own. Radiohead decided to self-release its forthcoming album, *In Rainbows*, directly via their website and retain all copyrights for the songs.

⁴ The name of the interviewee has been changed.

In October 2007, *In Rainbows* was released on Radiohead's website. Visitors were invited to pre-order the album for digital delivery and decide upon the amount they wanted to pay for it Chesbrough, 2010. This marked a significant break from the traditional, fixed-price method conducted in the recorded music industry, in which retailers typically charge \$0.99 for a digital song and \$9.99 or more for a complete album. In return for buying the album directly from Radiohead's website, the customer only had to provide a valid e-mail address and settle for a relatively low bit-rate version (160kbps) of the album. The album was free from any digital rights management (DRM) restrictions, meaning that there was no limit to the number of devices and computers from which the album could be played Elberse and Bergsman, 2008.

In addition to the digital recording, Radiohead self-released a set of limited made-to-order discboxes via their website. The discboxes included a second CD with additional songs, two 12-inch heavyweight vinyl records, a booklet of artwork and lyrics, and a digital download code. All discboxes were encased in a hardback book and a slipcase and sold for a fixed price of \$82. Only 100,000 copies of the discboxes were offered to the public. After two months, the pay-what-you-want download offer was discontinued and the album was released as a physical CD through an independent record company Moreau, 2013. The physical albums provided consumers with not only tangible features but also higher audio quality compared to the previous download offer.

Radiohead's business model experiment was "widely considered to have been a success" Chesbrough, 2010. Radiohead has not announced any official numbers regarding the pay-what-you-want download experiment. According to comScore 2007, 62% of those who downloaded the album chose not to pay for it, while the remaining 38% contributed an average of \$6; the average payment per all downloads was therefore \$2.26 (see Table 1). All 100,000 copies of the discboxes sold out, generating a total of \$8.2 million in revenue. After releasing the CD through traditional distribution channels, the album sold over 1.7 million copies in 21 months Chesbrough, 2010.

Insert Table 1 about here

TRENT REZNOR: GHOSTS I-IV

Trent Reznor is an American singer-songwriter, composer, and record producer. He is best known as the frontman and the only official member of Nine Inch Nails, an industrial rock group formed in 1988. In 2007, the group had fulfilled their contractual obligations with Interscope Records and decided to release their forthcoming album, *Ghosts I-IV*, independently. The decision came as a consequence of a long dispute between Trent Reznor and Universal Music Group, the parent company of Interscope Records, over the pricing and distribution policy of Nine Inch Nails' 2007 album *Year Zero*.

In March 2008, *Ghosts I-IV* was released on Nine Inch Nails' website. The album consisted of four EPs, each with nine songs. Consumers were invited to download the first nine songs for free against a valid e-mail address. In addition, Reznor personally uploaded the same nine songs to various file-sharing services, and stated that the band believes in finding ways to utilise the new technologies rather than fighting them. The entire 36-song digital album, in turn, was offered in a variety of formats for \$5. All songs were DRM-free, high-quality (320kbps) MP3s and came with a 40-page PDF book and digital extras. The songs were released under a Creative Commons licence, allowing non-commercial redistribution of the music.

In addition to the digital download offers, Trent Reznor offered a 2-disc CD set in a six-panel digipak package with a 16-page booklet for \$10; a Deluxe Edition package in a hardcover fabric slipcase with 2 CDs, 1 data DVD, a photo book, a Blu-ray disc of *Ghosts I-IV* in high definition stereo, and an accompanying slideshow, for \$75; and an Ultra-Deluxe Limited Edition (2,500 copies) package with everything included in the Deluxe Edition plus a four-LP vinyl set in a fabric slipcase and Giclée print

images, all wrapped in a luxurious package numbered and signed by Trent Reznor himself, for \$300.

Like Radiohead's experiment, Trent Reznor's business model experiment was considered "a huge success". Only the first week's data of online orders is publicly available, but it provides sufficient information to draw conclusions. In the course of one week, a total of 781,917 transactions occurred (including both free and paid downloads as well as orders of physical products through Nine Inch Nails' website), resulting in \$1,619,420 in revenue. See Table 2 for the distribution of purchases among the offered products.

Insert Table 2 about here

AMANDA PALMER: THEATRE IS EVIL

Amanda Palmer is an American musician known as the co-founder of The Dresden Dolls and, most recently, as the signer-songwriter of Amanda Palmer and the Grand Theft Orchestra. In 2010, Palmer stated that she had been released from her contract with her current record company, Roadrunner. Two years later, in April 2012, Palmer announced that she was going to crowdfund and self-distribute her next album, *Theatre is Evil*, independently.

In May 2012, Amanda Palmer created an account on Kickstarter, a crowdfunding platform for creative projects, and stated that she would try to raise \$100,000 to fund her newest album. Palmer emphasized that she was not collecting donations but rather selling pre-orders of various products that were offered through the platform. Palmer offered 24 unique products in 12 different price points that ranged from \$1 all the way to \$10,000. After that Kickstarter project ended in September, Palmer released the album on her website, where fans could download it for a voluntary

price. Also, Palmer signed a deal with an independent record company, which rolled out the album in music stores in a traditional manner.

In a similar fashion to the previous cases, Amanda Palmer’s experiment was hailed as “a massive success”. Palmer reached her initial goal of \$100,000 in only six hours. In the course of four months, 24,883 total transactions were conducted Kickstarter, 2012. Overall, those transactions generated \$1,192,793 in revenue – over 200 times more than an average music project receives through Kickstarter. Table 3 lists the distribution of purchases among the offered products. To simplify the table, the products that cost the same amount (e.g., the eight different offers priced at \$300) were grouped together and represent one data point in the table.

Insert Table 3 about here

Case study findings: value proposition and revenue model revisited

While each case study subject had a unique approach, the cases had a number of similarities from which we can draw conclusions. Before moving on to further analysis, Table 4 summarises all three experiments with regard to their value proposition and revenue model decisions.

Insert Table 4 about here

Acknowledging the superior value proposition of piracy – and the fundamental difficulty of charging for content that would be freely available through peer-to-peer services the moment after its release – Radiohead, Trent Reznor, and Amanda Palmer broke away from the recorded music industry’s standardised pricing policy. Instead, they gave away their newest albums, either for free or for a significantly cheaper price

than that of their counterparts in the business. The artists' aim was to make it as convenient as possible for consumers to acquire the digital recordings, thereby increasing their appeal to a wide audience. In contrast to the major record companies' stand on piracy, Trent Reznor and Amanda Palmer openly encouraged people to use peer-to-peer services to share their music Masnick, 2012; O'Brien, 2007. Instead of focusing on maximising the revenue coming from sales of the recorded music, the case study subjects treated each recording, rather, as a low-profit, promotional product that created awareness and goodwill, and therefore increased the probability that consumers would buy other, more lucrative, value-added products.

In addition to offering the recording, Radiohead, Trent Reznor, and Amanda Palmer each created an extensive portfolio of premium-priced, value-added products. They designed the value-added products to provide personalised and unique value beyond the music by bundling the recording with different tangible and intangible elements. When Radiohead, for example, offered their limited made-to-order discboxes for \$82, the band was essentially selling not the music – that, after all, could be downloaded for free through their website – but exclusivity to those fans who were willing to pay a premium for a collectible design item that could not be pirated. This trend of including value-added products was notably increasing throughout the given timeframe. Whereas Radiohead offered consumers 2 value-added products, Trent Reznor offered 4, and Amanda Palmer, 23. Whatever the artists might have lost due to giving away the digital recording for free or at low cost was more than compensated for by the sales of the value-added products.

In each case study, the digital recording attracted a large number of transactions but failed to turn into a significant stream of revenue due to its low price – or lack of any price at all. The value-added products, on the other hand, generated fewer transactions but turned out to be the primary source of revenue, a source that had been largely ignored in the previous one-product-fits-all business model.

Starting with Radiohead, the limited discboxes attracted only 100,000 transactions but generated over \$8 million in revenue. In Trent Reznor's experiment, the products priced below \$300 attracted 99.7% of all transactions but generated only 53.7% of total revenues. The \$300 Ultra-Deluxe Limited Editions, on the other hand, generated 46.3% of the total \$1.6 million in revenues from only 0.3% of all transactions. This trend continued in Amanda Palmer's experiment. In her crowdfunding project, all products priced below \$300 accounted for 96.5% of all transactions and generated 53.5% of total revenues. The products priced above \$300 attracted only 3.5% of transactions, but generated 46.5% of total revenues. On the extreme end of the product spectrum, the high-end, value-added products offered for \$1000 or more generated roughly 25% of the total revenues – even though they accounted for only about one half of one percent of all transactions.

In-depth interviews

The in-depth interviews were conducted to amplify and further analyse the case study findings. All interviewees were optimistic about the future of the industry and saw countless opportunities for all parties. The interviewees stated unanimously that people are still extremely interested in recorded music – and due to technological advances are consuming it more than ever before – but they are just not willing to pay for it per se, or are only willing to pay very little. The interviewees perceived the dominant business model as moving away from the digital download model towards the currently popular access-based model. But, offering recorded music is not enough anymore – “You have to have something extra to offer that is not the same thing as the digital music”, as Pereira, G. (personal communication, January 12, 2013) summarises it. While people certainly want to support artists, in return they expect to receive unique and personal value for their money. And the digital download option, Pöyhönen, J. (personal

communication, January 7, 2013) concludes, does not have that value in and of itself anymore.

“I think what you’re selling is more the experience. And the experience is the whole thing.... People will pay a lot of money for this coloured vinyl version, this box-set with CDs and the extra booklet that is signed – but they won’t pay for the basic which is available for download. I think that’s the big thing.” (Pereira, G personal communication, January 12, 2013)

All the interviewees agreed that more products in a wider range of price points are needed. Pereira argues that, as recorded music is becoming cheaper and cheaper, reciprocally an increasing amount of “deluxe versions” are being offered to attract consumers at the higher end of the market. The deluxe versions, Pereira continues, offer consumers value in terms of collectible design items that come with bonus material. Pereira’s own record company is a good example of the above-mentioned strategy; for each release, the company offers a limited edition vinyl along with the digital version of the recording. Pereira speculates that one reason vinyl sales are increasing year by year is not that people are suddenly listening to more records on vinyl – they still prefer the digital format that they often receive for free – but that vinyl has become a scarce design item that comes with bonus material and, of course, the recording itself.

Smith (personal communication, January 10, 2013) argues that the role of recorded music is changing; while the recording, by itself, may no longer offer enough value, it is increasingly becoming a promotional product that drives sales of other value-added products. When asked what types of novel products the recorded music industry might offer in the future, Smith argues that it really depends on how artists are able to utilise their powerful brands and their relationships with their fans. Smith encourages thinking beyond basic brand extensions to more creative bundling opportunities. The

recorded music business is not about selling albums anymore – it is about the artists on a wider level, as Pereira well concludes

”As in all marketing, there is a lot of discussion that brands have to be able to offer unique things or unique experiences to their fans. And I think artists have remarkable opportunities in doing that.” (Smith, personal communication, January 10, 2013)

Smith argues that artists nowadays are pushed to adopt a more commercial approach and think of how to create new revenue streams. Pöyhönen states that while recorded music on its own may no longer constitute a significant stream of income, exclusive product offers, when implemented properly, have proven effective at deriving revenues. Because of their significantly higher prices, small quantities of value-added products can generate considerable revenue. Therefore, they are well suited for niche markets. Pereira argues that while “casual buyers” are currently buying less and less recorded music, “hard-core users” are purchasing more than ever before. Pöyhönen argues that although there are less of these devoted fans, they are much more involved. The amount of people who got involved in Pöyhönen’s own crowdfunding experiment, for example, was not especially large – 158 transactions were conducted concerning 11 different products – but he more than doubled his initial fundraising goal. Pöyhönen concludes that his example illustrates that it is worth investing in exclusive elements:

“Even though there were only about 150 people involved, it generated that kind of amount of money.... It showed that wrapping [a] CD in a gift box and receiving a personalised card with it was popular. It clearly tells that something special is always nice.” (Pöyhönen, J personal communication, January 12, 2013)

Conclusions and further research

This article demonstrates the feasibility of offering recorded music as a free or low-cost promotional product bundled with more lucrative, value-added elements associated with the artist and the recording. At the heart of what we call the value-added model is the idea that music is offered as a promotional product to drive sales of products that, because they add value beyond the music, provide an incentive to pay a premium. The value-added model accepts the ubiquitousness of recorded music in the digital era. Recorded music has become a commodity that is endlessly available. Because of the abundance of digitised recorded music, people are consuming it more than ever before. Because recorded music, as such, has lost its monetary value, it should be bundled with something personal and unique – this can include anything from digital bonus features to physical ancillary products and services. There is a large demand for value-added products, and artists and record companies, as well as online music services, should try to seize that opportunity by offering premium-priced products.

As the case studies well described, artists are able to derive significant amounts of revenue from even a very limited number of premium-priced, value-added products. The role of recorded music, therefore, is to act as a promotional product that draws attention and enables sales of more lucrative, value-added products. While recorded music might not generate much revenue, it is an inseparable part of the total offering and, without it, sales of value-added products would not be possible. The case studies were followed by in-depth interviews that were conducted to verify the previous findings. The interviewees were chosen carefully, and they were experienced representatives of their own respective fields. To get a rich picture of the phenomenon of business model experimentation in the recorded music industry, the interviewees included an artist, a record-company owner, and a salesperson of a major music streaming service.

While the research tried to generalise as to how successful business model experimentation in the recorded music industry can be implemented, the results are mostly based on a limited number of case studies and in-depth interviews that were selected using the researchers' discretion. Since business model experimentation in the recorded music industry is still a relatively new phenomenon, related literature was quite difficult to find and academic research on the topic was practically non-existent. The in-depth interviews hopefully helped to support and amplify the previous study findings and, therefore, ensure better generalisability of the findings.

The disruption of traditional business models and the decreasing market share for incumbents is also apparent within the newspaper and video game industries, just to name a few. In the coming years, they will be forced to reinvent their traditional business models. It would be of great interest to study whether the value-added model, as proposed in this research, could also be applied in those industries.

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Tables

Table 1: Distribution of prices paid per downloaded album

Price	Product	Percent of total transactions	Percent of total revenue
\$ 0.00	Download	62%	0%
\$ 0.01- \$4.00		17 %	8 %
\$ 4.01 - \$8.00		6 %	12 %
\$ 8.01 - \$12.00		12 %	52 %
\$ 12.01 - \$20.00		4 %	27 %

(comScore 2007)

Table 2: Distribution of purchases through Nine Inch Nails' website

Price	Product	Percent of total transactions	Percent of total revenue
\$ 0	Download	99.7% (779,417)	53.7% (\$869,420)
\$ 5	Download		
\$ 10	2 CD set		
\$ 75	Deluxe Edition		
\$ 300	Ultra-Deluxe Limited Edition	0.3% (2500)	46.3% (\$750,000)

Buskirk, 2008

Table 3: Distribution of purchases through Amanda Palmer's Kickstarter website

Price	Product	Percent total transactions	Percent total revenue
\$ 1	Download		
\$ 5	Deluxe Digital Download		
\$ 25	Exclusive Limited Edition CD		
\$ 50	Exclusive Limited Edition Vinyl	96.5%	53.5%
\$ 100	Exclusive Signed Art Book	(23,941)	(\$603,874)
\$ 125	Exclusive Signed Art Book + CD		
\$ 250	Limited Edition 7" Vinyl, Surprise Arts 'n' Crafts Series		
\$ 300	7" Vinyl, Arts 'n' Crafts Series, Signed Art Book		
\$ 300	Art Opening / Backer Party		
\$ 500	Custom-Painted Turntable, Vinyl, CD, Art Book	3.5%	46.5%
\$ 1000	Donut with a rockstar	(879)	(\$524,500)
\$ 1000	Turntable, Vinyl, CD, Art Book, 7" Vinyl, Arts 'n' Crafts		
\$ 1000	Limited Edition Photobook		
\$ 5000	House Party with the artist		
\$ 10000	Art Sitting and Dinner with the artist		

(Kickstarter 2012)

Table 4: Summary of case studies regarding their value propositions and revenue models

	Radiohead	Trent Reznor	Amanda Palmer
Value Proposition	Digital version of the DRM-free album without cost, legally and directly via Radiohead's website. In addition to recorded music, two distinct products that add value in terms of scarcity, tangibility, design, and higher audio quality.	Digital version of the DRM-free album without cost, or at low cost, legally and directly via Trent Reznor's website or a number of file-sharing websites. In addition to recorded music, four distinct products that add value in terms of scarcity, tangibility, design, higher audio quality, and multiple formats.	Digital version of the album for very low cost, legally and conveniently via Kickstarter campaign website. In addition to recorded music, twenty-four distinct products that add value in terms of scarcity, tangibility, design, personalised events, and multiple formats.
Revenue Model	Offering recorded music for a voluntary price and compensating for that with two value-added products sold for premium prices. (\$13 - \$82).	Offering recorded music for free or a low price and compensating for that with four value-added products sold for premium prices (\$5 - \$300).	Offering recorded music for a very low price and compensating for that with twenty-four value-added products sold for premium prices (\$5 - \$10.000).

Appendix

Table A1. Online data sources for case studies

Author	Issue date	Title	Name	Access date	URL
Walker, T.	Jan 3 2008	Thom Yorke: Why he's glad to have made such a big noise	The Independent	Jun 6 2013	http://www.independent.co.uk/arts-entertainment/music/features/thom-yorke-why-hes-glad-to-have-made-such-a-big-noise-767870.html
Nestruck, K.	Nov 8 2007	EMI stab Radiohead in the back catalogue	The Guardian	May 15 2013	http://www.theguardian.com/music/2007/nov/08/emi.musicindustry
Thompson, P.	Oct 15 2008	Radiohead's In Rainbows successes revealed	pitchfork.com	May 15 2013	http://pitchfork.com/news/33749-radioheads-in-rainbows-successes-revealed/
Golson, J.	Apr 3 2008	Nine Inch Nails offer free tracks on BitTorrent, double album for \$5	Gawker Media	May 15 2013	http://gawker.com/363793/nine-inch-nails-offer-free-tracks-on-bittorrent-double-album-for-5
Buskirk, E.	Mar 12 2008	Nine Inch Nails album generated \$1.6 million in first week	Wired	May 3 2013	http://www.wired.com/listening_post/2008/03/nine-inch-nai-2/
Masnack, M.	Jun 6 2008	Trent Reznor continues to show how free music works In a business model	techdirt.com	May 2 2013	http://www.techdirt.com/articles/20080605/1638421319.shtml
Harding, C.	Aug 6 2010	Amanda Palmer tweets her way toward success	billboard.com	Nov 1 2012	http://www.billboard.com/articles/news/956985/amanda-palmer-tweets-her-way-toward-success
Palmer, A.	Apr 6 2010	Free at last, free at last (Dear Roadrunner Records...)	amandapalmer.net	Jun 6 2013	http://amandapalmer.net/blog/free-at-last-free-at-last-dear-roadrunner-records/
Berkowitz, J.	Jun 25 2012	How Amanda Palmer broke records – and other music industry stuff – on <i>Kickstarter</i>	fastcocreate.com	Jun 6 2013	http://www.fastcocreate.com/1680968/how-amanda-palmer-broke-records-and-other-music-industry-stuff-on-kickstarter
Houghton, B.	Jun 21 2012	D.I.Y. heroine Amanda Palmer signs sith indie label Cooking Vinyl	hypebot.com	Nov 20 2013	http://www.hypebot.com/hypebot/2012/06/diy-heroine-amanda-palmer-signs-with-indie-cooking-vinyl.html
Masnack, M.	May 4 2012	How Amanda Palmer Built An Army Of Supporters: Connecting Each And Every Day, Person By Person,	techdirt.com	Dec 15 2012	http://www.techdirt.com/blog/casestudies/articles/20120502/15324918745/how-amanda-palmer-built-army-supporters-connecting-each-every-day-person-by-person.shtml
Lindvall, H.	Sep 26 2012	Amanda Palmer raised \$1.2m, but is she really 'the future of music'?	The Guardian	May 13 2013	http://www.theguardian.com/media/2012/sep/26/amanda-palmer-future-of-music

CHAPTER 5: CONCLUSION

Innovation is a key function of all economic systems and few researchers will dispute its importance. In the last decade, the relevance of business models in the innovation process has grown steadily (Zott *et al.*, 2011). Increasingly, business models are being considered as the main determinant of performance and firms' competitiveness (e.g., Chesbrough, 2010; Teece, 2010, Zott *et al.*, 2011, Doganova and Eyquem-Renault, 2009). Business models differ from other management constructs (Zott and Amit, 2008), and they can give a profound insight into the mechanisms of value creation, delivery, and capture within a firm (Teece, 2010).

This dissertation analyzes business model innovation from various angles using various methods to improve our understanding of the complex phenomenon of business model innovation. It contributes to the research stream on business model innovation in three aspects. First, the key methodological contribution of this thesis is that it creates additional options to empirically study business model innovation, using large cross-industry databases. The method developed also enables to examine performance implications of different degrees of business model innovation. Second, it analyzes the industry-level antecedents of business model innovation, building on Utterback and Abernathy's (1975) model on the dynamics of product and process innovation. Third, it demonstrates ways to ease the complex and risky process of a business model innovation.

This final chapter is divided into three sections. The first section summarizes the main findings and contributions of each essay. The second section discusses the managerial implications of this thesis. Finally, the third section offers directions for future research.

Summary of the findings and contributions

Essay1: *Antecedents and consequences of business model innovation: The role of industry structure* (with Marion Poetz, Christoph Grimpe, and Markus Eurich)

Essay 1 addresses the impact of industry structure on business model innovation. We investigate how industry life cycle and industry competition motivate firms to innovate their business models, and how such change translates into firm-level innovation performance. Results indicate that although business model innovation is discussed as being most important in the later stages of the industry life cycle, the degree of business model innovation is greatest in the first life cycle stage. Surprisingly, competitive pressures within industries negatively influence the degree of business model innovation. A positive relationship between the degree of business model innovation and innovation performance while controlling for industry structure is found at the firm level. Essay 1 makes two contributions to the literature on business model innovation. First, it complements existing research by emphasizing the industry-level antecedents of business model innovation. Second, developing a measure for the degree of business model innovation using a large cross-industry database, we are able to provide broad empirical evidence on the relationships between industry life cycle stage, industry competition, and business model innovation.

Essay 2: *Crowdsourcing business model innovation* (with Marion Poetz)

Essay 2 explores the manner in which crowdsourcing-based search approaches can contribute to business model innovation. The findings demonstrate that crowdsourcing business model innovation produces numerous novel and valuable ideas with respect to all major dimensions of business model innovation, i.e., value creation, value delivery, and value capture. More than a fifth of the submitted ideas are

considered radical business innovations. The degree of change in the business model innovation ideas strongly correlates with the novelty and value of ideas. Lead users and personal creativity of users are identified as the main determinants of both idea submission and idea quality. Furthermore, perceived fairness of the crowdsourcing initiative positively influences the likelihood of idea submission as well as the ideas' degree of change, whereas attachment to the podcast in terms of how much users perceive themselves to be fans negatively influences both the quantity and the quality of the outcome. Finally, the findings of Essay 2 also indicate numerous prior knowledge assets, such as experience with business model innovation that impact both the qualitative and quantitative outcomes of the proposed business model ideas.

Essay 3: *Business model experimentation in the recorded music industry: Value beyond music* (with Kai Kirkkopelto and Kurt Heidenberger)

Essay 3 evaluates an ongoing business model experiment in the recorded music industry. In particular, we demonstrate the feasibility of offering recorded music as a free or low-cost promotional product bundled with more lucrative, value-added elements associated with the artist and recording. At the heart of the business model experiment proposed in Essay 3 is the idea that music is offered as a promotional product to drive sales of products that add value beyond the music, and therefore provide an incentive to pay a premium. The value-added model accepts the iniquitousness of recorded music in the digital era. As the case studies well describe, artists are able to derive significant amounts of revenue from even a limited number of premium-priced, value-added products. The role of recorded music, therefore, is to act as a promotional product that draws attention to and enables sales of more lucrative, value-added products. The case studies were followed by in-depth interviews conducted to verify the previous findings. To get a rich picture of the analyzed business model

experiment, the interviewees included an artist, a record-company owner, and a salesperson of a major music streaming service.

Managerial implications

This thesis also entails implications for the management of business model innovation. Essay 1 demonstrates that business model innovation is most prevalent in the emerging stage of an industry life cycle. On the one hand, this suggests that business model innovation should receive extra attention during the first industry life cycle stage. On the other hand, it indicates that there are strategic advantages of radical business model innovation in later industry life cycle stages, when competitors are focusing on incremental process and/or product innovation.

Business model innovation imposes high uncertainty on incumbents within highly competitive industries, as they risk losing their existing user base. Involving users early in the process of business model innovation might be a way to reduce this risk. Essay 2 demonstrates that crowdsourcing-based search approaches can be applied to generate novel and valuable business model ideas from users, which in turn could form the basis for business model experiments.

The role of experimentation is crucial for successful business model innovation (e.g., McGrath, 2010). Incumbents face severe barriers when trying to innovate their business models (Chesbrough, 2010). As Essay 1 indicates, radical business model innovation becomes more challenging when industries mature and competitive pressures become more severe. Experimentation is necessary to overcome the barriers imposed by the current dominant industry logic (Chesbrough, 2010; McGrath, 2010), while limiting the downside exposure (Thompson and MacMillan, 2010). Essay 3 suggests that those business model experiments seem to be undertaken by relatively small firms and startups rather than by incumbent firms. In that sense, this thesis also

adds to the argument that it is advisable to separate and protect business model experiments from the mainstream initiatives within a firm (Chesbrough, 2007).

Finally, Essay 1 illustrates that business model innovation positively affects firm-level innovation performance if combined with product and process innovation. This suggests that it is advisable to manage product/process innovation in combination with, rather than separately from, business model innovation.

Further research

This dissertation also opens up several directions for future research. First, future studies could build on the proposed method of measuring business model innovation to investigate other open questions in the respective literature. For example, this method could also be used to investigate in further depth the performance of particular patterns of business model innovation through the industry life cycle. Concerning the use of crowdsourcing in business model innovation in Essay 2, future research could conduct similar tests in different settings to gain a deeper understanding of the merits of crowdsourcing business model ideas. In particular, our setting did not involve any technology investments necessary to produce the value proposition. Another avenue for future work would be to directly compare competitive and collaborative crowdsourcing in generating ideas for business model innovation. Finally, with regard to Essay 3, it would be interesting to see whether the findings related to the music industry are also applicable to other industries that have been severely affected by digitization, such as the newspaper or video game industries.

I hope the contributions and findings of this dissertation will benefit future studies in advancing our understanding of ways to manage business model innovation for successful innovation performance.

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GERMAN SUMMARY

In den letzten Jahren hat Geschäftsmodellinnovation große Aufmerksamkeit, sowohl in der wissenschaftlichen Literatur als auch unter Praktikern erlangt. Etablierte Unternehmen mussten erkennen, dass Produkt- und Prozessinnovation nicht mehr ausreichen um auf Dauer wettbewerbsfähig zu bleiben. Ein Geschäftsmodell beschreibt das Grundprinzip nach dem eine Organisation Werte schafft, diese vermittelt und daraus Wertschöpfung generiert. Die Fähigkeit Geschäftsmodelle zu entwickeln, anzupassen und auszutauschen ist für Unternehmen von existenzieller Bedeutung. Vor diesem Hintergrund zielt die vorliegende Arbeit darauf ab, die noch recht junge Forschung zum Thema Geschäftsmodellinnovation anhand von drei Essays zu erweitern.

Der erste Essay untersucht die Auswirkungen von unterschiedlichen Phasen der Industrieentwicklung und von Wettbewerbsdruck innerhalb einer Branche auf Geschäftsmodellinnovationen. Mit der Konstruktion einer Maßzahl für den Umfang einer Geschäftsmodellinnovation, ist es möglich, große branchenübergreifende Umfragedaten zur Forschung an Geschäftsmodellen heranzuziehen. Der zweite Essay untersucht wie Crowdsourcing basierte Suchansätze zur Generierung von Ideen für Geschäftsmodellinnovationen verwendet werden können. Der dritte Essay beschreibt und analysiert ein konkretes Geschäftsmodellexperiment in der Musikindustrie.

Durch die Analyse von Geschäftsmodellinnovationen in unterschiedlichen Industrien, mit verschiedenen Datensätzen und Methoden tragen die in dieser Dissertation zusammengestellten Artikel zum Wissen über das Management von Geschäftsmodellinnovationen bei. In einem noch jungen Forschungsgebiet erzielt die Arbeit relevante empirische Erkenntnisse die auch für die Managementpraxis relevant sind.

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- 02/2007 – 02/2009 Lecturer on Business Process Management at University of Applied Sciences Wiener Neustadt and University of Applied Sciences Technikum Wien
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Skills

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<i>Innovation and Technology Management</i> , 4 ECTS course in Business Administration Bachelor program, University of Vienna							x	x	x	x	x	x	x		x
<i>Applications of Innovation and Technology Management</i> , 4 ECTS course in Business Administration Bachelor program, University of Vienna										x		x		x	x
<i>International Innovation and Technology Management</i> , 4 ECTS course in Business Administration Master program, University of Vienna															x
<i>Entrepreneurship: Innovation and Marketing</i> , 3 ECTS course in Entrepreneurship Extension Curricula program, University of Vienna									x		x		x		x
<i>Business Process Optimization</i> , 6 ECTS course in Industrial Engineering Program, University for Applied Sciences Wiener Neustadt				x		x									
<i>Business Process Management</i> , 6 ECTS course in Business Administration Master program, University of Vienna		x		x											
<i>Business Process Modeling</i> , 1 ECTS course in Business Informatics Master program, University of Vienna			x			x									
<i>Business Process Modeling</i> , 2 ECTS online course in Business Informatics Master program, Virtual Global University			x			x									
<i>Business Process Modeling</i> , 3 ECTS course in Business Informatics Bachelor program, University of Applied Sciences Technikum Wien	x														

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