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Additional Information

***Knowledge- and innovation-based business models for future growth:
Digitalized business models and portfolio considerations***

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Abstract

Today's key challenge for firm growth relies in the integration of digital technologies and their use in new business models. Thus, firms increasingly engage in a digital transformation and in digitalizing their business model. Firms can apply digital technologies for improved or novel internal and external processes and integrate them in new business models. The digital transformation itself demands diverse knowledge from diverse origins in the firm. We examine the key concepts related to business model digitalization. We develop a conceptual matrix for portfolio considerations of firm business model digitalization. We introduce the seven contributions in this special issue on knowledge and innovation related to business and offer some recommendations for future research on the new working conditions and digital identities of firms.

1. Introduction

Current products, services, procedures, operations, and technology rely increasingly on digital technologies and their configuration (Yoo et al. 2012; Zammuto et al. 2007). Recent digital technology advancements are requiring firms to develop, and implement a wide range of digital activities in both their national and global business models (Kraus et al. 2019; Tallman et al. 2018). Digital transformation, or short *digitalization*, describes the increasing implementation of digital technologies and the transformation of conventional processes into digital ones in organizations (Kohli and Melville 2019; Lanzolla et al. 2018).

Digital technologies can take various forms including platforms (Clauss et al. 2018a), big data and artificial intelligence (O'Leary 2013), 3D printing (Bouncken et al. 2019b), block-chain (Morkunas et al. 2019), and practices tightly related to technology use, for example crowdfunding (Bouncken et al. 2014; Medina-Molina et al. 2019). The digitalization and its business models strongly build firm's growth (Laamanen et al. 2018; Teece and Linden 2017). Today, especially the highly growing firms show a high attention to digitalization, taking opportunities in technology, processes, and markets (Probst et al. 2018). On the opposite, firms which are slow and diffident in digitalization will endanger in their growth, even their existence in the long term (Kraus et al. 2018).

Digital technologies form the basis for digitalization, but firm performance and growth stems from their configuration of activities for value creation, value proposition, and value capture – thus from the firm's business model(s) (Alberti-Alhtaybat et al. 2019; Sohl et al. 2018). The business model explains the “...logic of the firm, the way it operates...” (Demil et al. 2015, p. 3), and “... the design or architecture of the value creation, delivery,

and capture mechanisms” (Teece 2010, p. 172) of the firm. Business models encompass both internal and external relationships such as alliances (Bouncken and Fredrich 2016).

Firms need to consider appropriate and possibly new business models in the digitalization, but research is just starting to acknowledge business models related to digitalization (Tallman et al. 2018; Massa et al. 2017) although the original business model was inspired by e-business (Amit and Zott 2001). For example, firms in the sharing economy rely on digital technologies and digital business models to provide new material-based solutions via digital platforms (Cennamo 2019; Hamari et al. 2016; Richter et al. 2015). In addition, information technologies affect the adoption of environmental practices (see Muñoz-Pascual et al. (2019) in this issue).

Firms can apply digital technologies for improved or new processes internally and with their supply chains and their environment and use them for developing their business models. In this special issue, Devece et al. (2019) examine crowdfunding, Muhic and Bengtsson (2019) discuss cloud computing, and Miranda et al. (2019) investigate consumers’ perceptions regarding the credibility of YouTuber-generated product content (YGPC). With respect to digital technologies, the internal and external sources might build the basis for value creation and value propositions, but the value capture among sources is often endangered by serious tensions among partners (Fredrich et al. 2019).

Digital technologies and especially their advancements facilitate complex tasks which demand high levels of knowledge that can be dispersed in different functional units or in external firms (Nambisan et al. 2017). Value creation, value proposition, and value capture to enable growth and digital transformation requires the firm to create knowledge and to exchange knowledge with other firms. Digital transformation and firm growth depend on knowledge work and collaboration. Digital transformation is requiring a move away from

traditional working forms especially silo working. It is requiring new organizational forms (e.g. agile teams - see Brand et al. in this special issue on agile front end of innovation (AFEI)), and open workspaces to allow coworking. Exchange and collaboration are crucial for firm performance and firm digitalization. However these conditions might differ between large firms and small and medium sized enterprises (SMEs) (see the paper by Muñoz-Pascual et al. in this special issue. Innovation is at the heart of digitalization and business model. Digitalized business models concerning digitalization and innovation are in a duality relationship. The digital business models demand technological and organizational innovations and at the same time breeds technology and organizational innovations.

Since 2010, research on innovation and knowledge in diverse fields has burgeoned (Bouncken and Aslam 2019; Grewal et al. 2018; Grigoriou and Rothaermel 2017; Roy and Sarkar 2016) and includes work focused on business models (Clauss et al. 2018b; Foss and Saebi 2017; Laamanen et al. 2018). Yet, only scant research is located at the interface of digitalization, business models, and their relationship to innovation and knowledge. To make changes to the business model (Sosna et al. 2010) requires both knowledge and a change to managers' thinking. There is a gap in our knowledge about innovation related to business model digitalization.

This is the focus of this special issue. Our aim is to provide a better understanding of the knowledge-based and innovation-based business models underlying firm growth based on theoretical and empirical research. The papers included in this special issue explore the linkage between knowledge generation and business model innovation and/or examine the effects on firm performance of an innovative business model. All of the included papers have either a digital technology or an organizational focus. Following a conceptual overview and

a summary of the theory on digital business portfolios, we contextualize those papers and develop some further ideas on claims for theory development finally.

2. Background

The business model concept was inspired by managerial practice (Demil et al. 2015; Zott et al. 2015) related to e-business (Amit and Zott 2001). The notion of business model became the basis for analyses of firm activities and business model configuration (Morris et al. 2005; Pinazo-Dallenbach et al. 2016; Zott and Amit 2010). Business models refer to a structural template of how firms run and develop their business on holistic and system-level (Amit and Zott 2001; Clauss et al. 2019b). Three main domains explain a firm's business model (Baden-Fuller and Mangematin 2013) value proposition, value creation, and value capture (Clauss et al. 2019a; Massa et al. 2017; Zott and Amit 2010). Value proposition explains which solutions firms offer to whom and how (Morris et al. 2005). Value creation refers to how the firm creates value along the value chain based on available resources and organizational processes (Achtenhagen et al. 2013). Value capture refers to how the firm captures value in the form of revenue to cover costs, allow sustainable performance, and provide profit.

Changing ecosystem conditions such as a focus on sustainable use of resources can induce the firm to adjust its business model (McGrath, 2010). Thus, the business model provides a linkage between the strategy and the operational level as the "... reflection of a firm's realized strategy" (Casadesus-Masanell and Ricart 2010: 195).

Business models are not static; they are dynamic (Demil et al. 2015; Morris et al. 2005) and demand a level of entrepreneurship from the firm and its external counterparts (Kraus et al. 2016; Paniagua et al. 2017, Richter et al. 2017). Innovations in technologies,

processes, and organizational patterns might inspire or underlie new and developed business models. Very influential or holistic changes refer to business model innovation. Business model innovation puts the business model as the subject of the innovation (Clauss et al. 2019b). Business model research (Baden-Fuller and Haefliger 2013; Baden-Fuller and Mangematin 2013; Kraus et al. 2019) suggests that business models can include innovative components, but business models innovation considers a change of all domains. The change of only one component or a single domain e.g. value capture does not permit to apply the concept of business model innovation (Casadesus-Masanell and Ricart 2010). Business model innovation covers the innovation of a system of products, services, technology, and/or innovation flows. Often these innovations move beyond the focal firm boundaries to the proposal, creation, and capture of value, forming collaborative structures of revenues (Bouncken et al. 2019a, Hora et al. 2018). Instead, business model reconfiguration explains partial, incremental or radical changes in the business model (Clauss et al. 2019b).

Typically, incumbent firms have greater problems with innovating the business model because the actual business model and the value chain elements exist in parallel to the novel model (Markides 2013). Similarly, older and big incumbent firms have problems in the digital transformation. Firms need an entrepreneurial behavior of their managers on different levels and units of the firm (Hughes et al. 2018). An incumbent's old model might lack components necessary for innovative business models. Casadesus-Masanell and Zhu (2013) model that adopting components or models of young firms might help incumbents in their business model innovation.

Digitalization and innovative business models face problems related to cognitive inertia which makes identification and implementation of novel solutions more difficult (Berends et al. 2016). Changes to the business model are triggered by knowledge exchanges

and identification of differences among knowledge stocks (Martins et al. 2015). The creation of knowledge especially joint creation associated to sense-making (Ribeiro-Soriano and Kraus 2018) potentially can trigger changes to firms' business model configurations (Pesch and Bouncken 2018). Knowledge transfer can help to break trajectories that limit the identification and implementation of digital technologies and business model innovation (Berends et al. 2016).

Business model innovation, particularly of incumbent firms might build upon new or newly configured components only inside the firm but also using components from the outside, of alliance partners besides their risks (Bouncken et al. 2018a). Even though business models are often understood as crossing firms' boundaries, there are only a few empirical studies as case studies (Ritala et al. 2014; Frankenberger et al. 2013). Studies stress that innovation and knowledge shape the basis of business model development (Osiyevskyy and Dewald 2015; Andries et al. 2013), yet results how this applies to firm growth and to digitalization are largely missing. Knowledge and growth particularly relate to business models that strongly use digital technologies for value creation, value proposition, and value capture. A few case studies have considered business models and their development by digital technology implementation, especially by focusing on sharing economy and platform business models (Hamari et al. 2016; Morkunas et al. 2019). Yet, concepts and more strategic considerations of business models on digital technologies are missing or fuzzy.

2. Digitalized Business Model and Digital Business Model Portfolio

Firms need to develop, change, and exchange technical knowledge related to digitalization and adaptations to and generation of new business models. Digital technologies

are complex and require knowledge that often is dispersed within the organization. To achieve improved performance and growth based on the digitalization, firms need to combine knowledge on digital technologies and digital transformation with knowledge about organizing new or additional business. Collaboration and exchanges among different experts and units are required for growth and performance.

2.1. Understanding Digitalized Business Models

Business models might be largely digital as for digital platform firms where most value creation, proposition and capture operates via digital processes and technologies. Other business models, e.g. of incumbent firms might be traditional but increasingly become more digital. In digitalizing their business models firms' business models become more digital but still will need manager's processes. Today, any firm will still demand human processes in their business models. The term digital business overstates the digital technology. In marking the digitalization of the business and its increasing importance, we use the term digitalized business model. The term digitalized business model defines the business models in which digital technologies have a significant impact on all dimensions, the value creation, value capture, and value proposition. Digitalized business model might use very novel or less novel digital technology, but the necessary condition is that all dimensions use digital technologies, not only certain activities of the firm. We are well aware that the term significant is fuzzy. Yet, the diverse digital technology and the magnitude of diverse uses make considerations about certain degrees unrealistic.

2.2. Digitalizing Business Models

Firms might start with digitalizing their business model by certain technologies, changing their activities, and using digitalizing for value creation, capture, or proposition. Over time, firms very likely will implement ongoing changes that will alter the digitalization of the business model, possibly leading to digitalized for value creation, capture, and value proposition, thus for a digitalized business model. Thus, digitalizing the business model describes organizations ongoing efforts in digital transformation towards more digital technologies, digitalized activities, and value creation, capture, and proposition. For digitalizing their business model, firms will have some of the knowledge already in the firm but other knowledge needs to be developed internally or in external collaborations. The creation of knowledge needs resources, effort, and attention from diverse organizational members.

2.3. Attention and Portfolio Considerations for Digitalized Business Models

Especially the development of a digitalized business model needs attention by managers. Attention is a limited (Haas et al. 2015). Some issues, tasks, or domains attract greater levels of attention or priority than others (Cho and Hambrick 2006; Tuggle et al. 2010). Attention has a strong impact on resource allocation related to problems, problem-solving, and the speed and effectiveness of managers decisions (Sullivan 2010). Different problems compete for attention and so do digitalized business modes.

Considering the demands of knowledge, resources, and attention, firms have to decide the portfolio of their business models concerning the digitalization. Firms might have one business model or several ones. When digitalizing, firms might aim to change their existing business model(s) or to try out new digitalized business models. The change of a business

model and the development of a new digital business model takes effort and attention of managers. A change of existing business models might put the firm's actual business model at risk and firms might be hesitant in the change and thus leave too many activities unchanged. The change of the value creation, proposition, and value capture might not be radical enough. The future development and change might be too restricted. Hence, when changing their established business model into a more digitalized form, firm encounter the strategic tension about endangering the running business model and failing in meeting future opportunities in digitalized business models. Alternatively, firms might pursue a digitalized business model besides their traditional model. Changes and adaptations towards digitalization might occur constantly in the new business model. Although the new digitalized business model could be spatially and/or strategically (e.g. by corporate venturing) separated from the traditional business model, it might influence the traditional one. Resources, effort, and attention might shift towards the new one and strip the old one of key resources and attention. At the same time, the new digitalized business model might not get sufficient information, because managers lack expertise in the new technology and market and pay more attention to the traditional business. Rigidities of the traditional model might stretch to the digital mode. As attention influences resource allocation to problems (Sullivan 2010) manager might be too slow and less proficient in their decisions for the new, alternative business model. Thus, the new business might not receive sufficient support.

Figure 1 depicts the positioning of the business model based on level of digitalization and firm focus on its business models. The first dimension of this matrix considers the level of focus on one or several business models. The second dimension of the matrix refers to the degree of digitalization. However, the degree of digitalization is not digital. Thus, the classification of low and high is rather rough and requires the development of measures. The

matrix shows that firms can choose among different options. They need to choose which digital technologies to implement and develop. The digital technologies chosen will affect the firm's value creation, value proposition, and value capture.

Insert figure 1 about here

2.4. Implementation Hints

When firms consider their digitalization of business models from a strategic portfolio approach they have to manage the strategy implementation. Business model development demands ongoing changes, adaptations, experimentation and as such continuous attention of managers (Ocasio et al. 2018). Firms might purposely manage the attention for traditional and for digitalized business models by establishing plans, meetings, and integration templates. Yu et al. (2005) has shown that the success of Mergers & Acquisitions can improve, when attention is strategically managed by plans, processes, and system integration templates. Following these presets help to secure the attention on the post-merger integration process. Attention relates to deliberate and emergent behaviors in the process (Yu et al. 2005), so attention can shift and depart from prior plans. Thus, using plans, processes, and system integration does not guarantee attention. Still, templates firms guide the attention on changes towards digitalized business model in the course of their implementation.

The attention based view has shown that personal interactions support attention of managers (Ocasio et al. 2018). We argue that decisions about technology investments and the related practices (e.g. crowdsourcing) demand interactions and collaboration among

experts in different fields and firm units – and at different levels in the organization. Top-down and bottom-up interaction and collaboration will facilitate development of implementation of digital technology in the business model. We argue that an agile structure (see Brand et al. (2019) in this special issue) and new collaborative forms of working will increase exchanges of knowledge among individuals at different levels and from different units in the firm. Coworking should involve new contemporary work- and social spaces to stimulate exchanges among firm members (Bouncken and Reuschl 2016). The pure spatial and interior design of coworking-spaces attracts attention of managers. Coworking-spaces stimulate knowledge transfers among experts from different levels (Bouncken et al. 2018b). Thus, new agile forms of work as in coworking-spaces will help to create and implement digitalized business models and other options that facilitate growth of firms.

3. Overview of the research in this special issue

This special issue was triggered by the 2019 conference on "Knowledge, business, and innovation – Economies and sustainability of future growth", held at the University of Verona (Italy) on June 11-13, 2019. The topic of this special issue – Knowledge- and innovation-based business models for future growth – had its own track at the conference, which served as a first-round review of some of the submissions to the journal. The special issue was also open for external submissions. As a result, this special issue includes seven contributions on the digitalization of entrepreneurship, encompassing important topics like crowdsourcing, cloud computing, and Youtube-generated content as well as on

organizational solutions for the change that comes with digital business models and innovation on the other side.

The conference accepted 27 for this track. It was possible to submit either an extended abstract or a full paper. Submission was possible either via the conference, or independently submitted directly to the journal. For those papers submitted via the conference, the two reviews for the conference track served as a first round review. 27 full papers were then submitted in the next round via the *Review of Managerial Science* online submission system. Regardless of how the papers were submitted, all entries for this special issue had to go through an additional review process following the conference. This process required approval from at least two anonymous reviewers in order to be selected for publication in the journal. Twelve articles made it into a second, and seven to a third (thereof again two to an additional fourth) round of revisions, before being finally accepted for publication in this special issue.

The first papers in this special issue focus on digital technologies and how they are embedded in the organizational structure and the management of firms. The other papers focus on organizational solutions for the change that comes with digital business models and innovation. Firms are already paying high attention to digital technologies related to crowdsourcing, cloud computing, and Youtube while considering how to make best use of them.

Devece et al. (2019) consider crowdsourcing as an information technology (IT)-based decision tool which supports firms pursuit of market information and market-oriented predictions. Their findings are based on a survey of 221 firms in the Spanish telecommunications and biotechnology sectors. Their study uses the Smart-PLS package PLS-SEM. It shows that crowdsourcing is dependent on transformational management of the

firm's marketing strategy. The underlying logic is that crowdsourcing is used to motivate consumers' and experts' participation on technology platforms.

Muhic and Bengtsson examine cloud computing business models from a process perspective, in relation to adoption and use of the cloud. They analyze the capabilities required to exploit cloud computing for business model innovation. Their case-based study finds that the underlying technology is complex and can hinder business development in the initial stages. In the later business development stages, shortage of dynamic capabilities combining knowledge in IT and business is the main problem. Firms need competencies through re-aligning structures and internal culture together with a strong sustained innovation dialogue with the cloud providing partners. Cloud computing is a matter of the IT-function. This function lead and govern relationships with cloud providers. Relationships demand routines for handling technical issues and in addition, managing internal key elements in the business model; i.e., internal process and organizational innovations. A competent top management of the IT-function will be able to orchestrate cloud source providers towards a sustained business model innovation.

Miranda et al. (2019) analyze consumers' perceptions about the credibility and utility of YGPC. YouTube provides a video web platform which allows huge numbers of visits. The content creators, the YouTubers, can build forge bonds with their audiences by sharing intimate experiences and conversations on personal and sensitive topics. The higher the number of views and likes the greater the perception of the credibility of these videos. The authors examine the impact of these perceptions on attitudes to YGPC related to purchase decisions. Their results are based on the responses to an online survey of 315 YouTuber followers estimated by employing a structural equation modeling (SEM) approach. The model shows a complex web of antecedents and outcomes and the findings provide insights

into the credibility of YouTuber-generated content and information on product purchase decisions.

Muñoz-Pascual et al. (2019) examine whether and how IT affect adoption of environmental practices by SMEs. They shed light on how SMEs can use IT to support adoption of environmental practices. Their multi-method study uses qualitative and survey data. The survey data are from an online survey of a sample of 349 Portuguese SMEs. The data were analyzed by fuzzy-set qualitative comparative analysis (fsQCA) and the hypotheses were tested employing SEM. The Results show that information technology is key to the adoption of new environmental practices and is more important than human resources.

Pierscieniak and Krawczyk-Sokolowska (2019) provide a literature review and case study of the drivers of innovation in Poland. They differentiate between micro and macro criteria. They show that in a digitalizing world firm innovativeness depends on open, multi-directional, fast, and efficient IT based communication systems to exploit firms' innovation potential.

Castellani et al. (2019) examine the accumulation of knowledge. Their findings are based on a study of Italian engineering consultancy firms whose organizational knowledge depends on their ability to exploit experience and expertise learned from past projects. Their case study shows that the sharing of abstract knowledge occurs on a practical level. Firms' knowledge sharing and knowledge accumulation are facilitated by flexible teamwork structures and a culture that supports knowledge exchange.

Brand et al. (2019) develop a new Agile Front End of Innovation (AFEI) framework, which can firms reaping advantages of innovation through agility on developing the front

end of innovation. Their overview of the literature identifies seven agility enablers which influence the innovation front end: employees, leadership style, culture, organizational system, corporate strategy, technologies, and customer integration. They interviewed an R&D manager on the basis of which they propose an agility enabler attributes matrix as the basis for an agile front-end innovation framework. They show that employees, customers, and state-of-the-art digital technology are crucial for successful front end of innovation.

4. Directions for Future Research

Digitalization and digitalized business models call for new management approaches. In the context of creating a new business model, Berends et al. (2016) employ analogic reasoning and conceptual combination. Analogic reasoning refers to the “application of structured knowledge from a familiar domain to a novel domain” (Berends et al. 2016, p. 106). Both can explain the generative cognition mechanisms in business model innovation. Analogies can be used to describe novel or complex experiences and guide the transfer of or changes to design logics when redesigning or innovating the business model. Firms might apply analogic reasoning and conceptual combination to develop ideas and concepts for digital transformation and for digital business models in particular. Additionally, new work forms might help to create ideas for digital transformation and for digital business models. Agile work forms, inspired by IT-development, might help to run cross-sectional projects quickly (Ghezzi and Cavallo 2018). Firms could configure new coworking spaces to allow individuals to discuss digital solutions and digital business models in collaborative and stimulating creative spaces (Bouncken and Reuschl 2018; Colbert et al. 2016). In addition,

the configuration of the top management team could facilitate decision-making and collaboration (Garcia De Lomana et al. 2019). Digitalization refers also to consideration of what is appropriate and legitimate for a particular industry, field, or category. Digitalization might require changes to institutional logics and processes (Soublière and Joel 2019; Suddaby et al. 2017). Future research could examine legitimization processes and why and how firms change and their category homes. Digital technologies could trigger strong attachments (see e.g. the *digital natives* concept, Wang et al. 2013) or antipathy and anger. Future research could investigate organizational members' socio-emotional processes related to digitalization that lead to in-group and out-group categorization processes and identification processes (Humberd and Rouse 2016) as suggested by the concept of digital identity (Bouncken and Barwinski 2020).

Figures

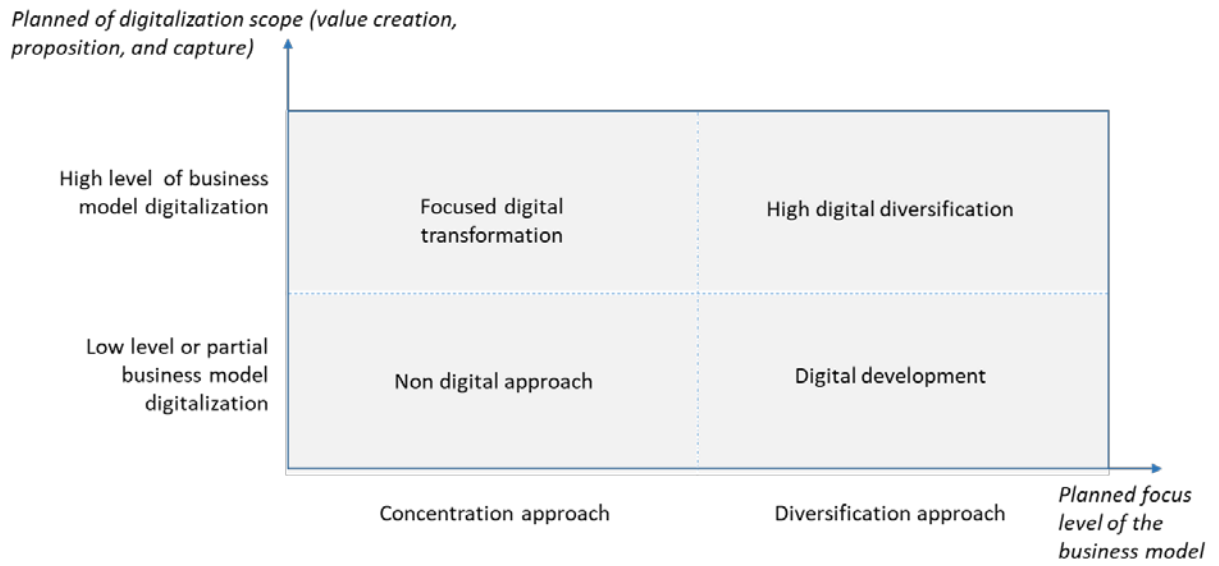


Figure 1: Approaches to Firm Business Model Digitalization

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