

Digitalization and its influence on business model innovation

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BMI

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Abstract

Purpose – Increased digitalization has influenced various business activities including companies' business models (BMs) by enabling various new forms of cooperation between companies and leading to new product and service offerings as well as new forms of company relationships with customers and employees. At the same time, this digitalization has put pressure on companies to reflect on their current strategy and explore new business opportunities systematically and at early stages. While research on digitalization in the context of BMs is now gaining increased attention, a research gap still exists in this field since the number of empirical insights is limited. The paper aims to discuss these issues.

Design/methodology/approach – Qualitative empirical data collected from 12 key informants working in two distinctive industries, the media and automotive industries, were collected. An investigation was carried out to examine the differences and similarities among how digitalization influences a company's value creation, proposition and capture, as well as how firms cope with challenges presented by increased digitalization.

Findings – The findings of the study show that, whilst digitalization is generally considered to be important, the value proposition itself as also the position in the value network determine the perceived available options for business model innovation (BMI) by digitalization. Moreover, the organizational capacities and employee competences were identified as future challenges that will be faced by both industries.

Originality/value – The findings of this study have revealed that representatives of the media and automotive industries perceive both the pressures and opportunities of digitalization regarding BMI; its application and exploitation, however, remain challenging. This study contributes to the existing body of knowledge by providing empirical insights in the context of digitalization and BMI.

Keywords Digitization, Innovation, Dynamic capabilities

Paper type Research paper

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1. Introduction

Over the past few decades, global industries not only have faced technological changes that have led to opportunities such as greater flexibility, reactivity and product individualization, but also have presented diverse challenges such as rapid technological change, increased complexity and changing customer preferences and legal requirements. This has led to challenging situations in a corporate context: manifold new technological opportunities are perceived, but people are uncertain how to use and implement them simultaneously in terms of product and service offers (Lerch and Gotsch, 2015). The situation in the field of digitalization and business model innovation (BMI) is interesting because the influence of digitalization on the business model (BM) is fuzzy, and the exploitation of technological opportunities – also from a strategic viewpoint – is challenging (Mezger, 2014; Loebbecke and Picot, 2015; Paulus-Rohmer *et al.*, 2016; Bouwman *et al.*, 2017).

Digitization (i.e. the process of converting analogue data into digital data sets) is the framework for digitalization, which is defined as the exploitation of digital opportunities. Digital transformation is then defined as the process that is used to restructure economies, institutions and society on a system level (Brennen and Kreiss, 2016; Unruh and Kiron, 2017). While the latter embraces changes on all societal levels, digitalization by means of combining different technologies (e.g. cloud technologies, sensors, big data, 3D printing) opens unforeseen possibilities and offers the potential to create radically new products, services and BM (Matzler *et al.*, 2016). These innovations could lead to new forms of cooperation between companies or the modification of relationships with customers and employees (Kiel *et al.*, 2016 referring to Kagermann *et al.*, 2013). As a result of this new embedded usage of digital technologies, companies can achieve success in terms of experiencing optimized resource utilization, reduced costs, increased employee productivity and work efficiency, optimized supply chains, increased customer loyalty and satisfaction, to name but a few (Coupette, 2015; Kagermann *et al.*, 2015; Kaufmann, 2015; Loebbecke and Picot, 2015). However, as argued above, the increasing number of opportunities driven by digitalization also put pressure on companies “to critically reflect their current strategy” and “to systematically and early identify new business opportunities” (Kiel *et al.*, 2016, p. 675) and requires “managers to significantly adapt one or more aspects of their business models” (Wirtz *et al.*, 2010, p. 273) or even design completely new ones. In one of the latest surveys on digitalization (McKinsey Global Survey, 2014, p. NOS), executives reported that their CEOs “are more involved in digital efforts than ever before” but at the same time they say that “their companies must address key organizational issues before the digital can have a truly transformative impact on their business.” In this context, one can assume that digitalization has a *de facto* influence on every industry as it impacts corporate strategies and challenges existing BMs to be reconsidered and adapted (Linz *et al.*, 2017). The extent, however, to which digitalization impacts corporate activities and leads to BMI differs from industry to industry and takes time since “business models are more context-dependent than technology,” depending on resources and capabilities that are available within the respective company (Teece, 2018, p. 45). In this context, the goal of this research was to explore if and how digitalization influences a company’s BM and leads to BMI. For this purpose, the business logic triangle (Osterwalder and Pigneur, 2002) in combination with the perspective offered by the dynamic capability view (Teece *et al.*, 1997; Mezger, 2014; Teece, 2018) was employed as the conceptual setting. The BM as such is understood as the “architecture of the value creation, delivery, and capture mechanisms [a firm] employs” (Teece, 2018, p. 41). The research questions addressed were:

RQ1. How does digitalization influence a firm’s BM?

RQ2. How do firms cope with the digitalization of their BM?

To explore these two research questions, two distinct sectors, the automotive industry and the media industry, were chosen as samples. A qualitative empirical research design, incorporating 12 expert interviews, was applied to provide insights and cast light on the practical and theoretical implications of the data collected. While the shift from printed products to a service-based value proposition has already taken place in the media industry (Mezger, 2014), manufacturing industries, such as the automotive sector, are facing different challenges in the context of digitalization. These include the Industry 4.0 movements, although industries in the automotive sector still remain car manufacturers themselves or ancillary industries and not digital businesses (Svahn *et al.*, 2017).

The paper is structured as follows: the theoretical background is described in Section 2; the research method and empirical settings are presented in Section 3; the results of the case study for the automotive and media industry are presented in Section 4; the results of the studies are discussed in Section 5; and conclusions are presented in Section 6.

2. Theoretical background

2.1 Digitalization in the context of the company

Digitalization and, later, digital transformation are drivers for changes in the corporate world, because they establish new technologies based on the internet with implications for society as a whole (Unruh and Kiron, 2017). While digitization describes the process of the conversion of analogue and noisy information into digital data (Brennen and Kreiss, 2016), digitalization is used to describe any changes in the organization and the organization's BM due to their increasing use of digital technologies to improve both the performance and the scope of the business (Westerman *et al.*, 2011). In a third step, Bloching *et al.* (2015) interpreted the digital transformation as the continuous interconnection of all business sectors and the actor-side adaptation to the requirements of the digital economy, whilst Unruh and Kiron (2017) defined it as the systems-level restructuring of economies, institutions and society that occurs through digital diffusion. Digitalization as such developed from a form of technical evolution to a phenomenon that can impact any kind of organization. The physical and digital world are converging increasingly frequently and need to work hand-in-hand, so that manufacturing companies can also become digital (e.g. Industry 4.0) (Linz *et al.*, 2017). This can happen, for example, by integrating the Internet of Things and Services into industrial processes (Kagermann *et al.*, 2013) and generating value by analyzing and managing data that can be used as a source of competitive advantage (Porter and Heppelmann, 2015). As such, many changes led by digitalization are disruptive and completely change the existing branches (Matzler *et al.*, 2016). Companies that have dominated the market are confronted by new competitors that redefine the established industries (Linz *et al.*, 2017), so that existing BMs become obsolete and are replaced by new ones (Souto, 2015; Matzler *et al.*, 2016). The recent developments that took place in the 2010s, such as the mobile revolution, social media or the power of analytics, specifically led to the digital transformation of BM. Anything-as-a-service models emerged were platforms with business networks and ecosystems are promoted. In the meantime, customers can receive pervasive access to information via the internet and have multiple channels to choose from (Linz *et al.*, 2017; Berman and Bell, 2011). While competition takes place on the basis of outstanding BMs (Linz *et al.*, 2017), companies need to innovate their BMs to be successful in the digital world. This implies that technologies and BMI are complementary (Chesbrough, 2010).

2.2 BMs and BMI

While it is generally acknowledged that "a business model describes an architecture for how a firm creates and delivers value to customers and the mechanisms employed to capture a share of that value" (Teece, 2018, p. 40), agreement on the theoretical aspects is lacking. This

leads to a situation in which the core constructs are not defined and dimensionalized adequately (Foss and Saebi, 2018), which also makes it difficult to conduct empirical testing. Nevertheless, BMs are helpful concepts that represent elements and relationships in business activities for the purpose of planning, communication or improvement (Massa *et al.*, 2017) as they link strategies with business processes (Osterwalder and Pigneur, 2002). With the help of BM concepts, a company is able to describe its business in terms of “what it does,” “what it offers” and “how the offer is made” (Ritter and Lettl, 2018).

In recent years, the BM itself has increasingly become a source of innovation and competitive advantage (Hossain, 2017). Different executive studies (The Economist Intelligence Unit, 2005; KPMG International, 2006) and scientific studies (Spieth *et al.*, 2014) have defined the reasons for the need to develop innovative BM. As in the definition of the BM concept, there is not yet a consensus for the definition of BMI (Mueller, 2014; Foss and Saebi, 2017). On the one hand, BMI is described as a process (Schallmo and Brecht, 2010; Berglund and Sandström, 2013; Matzler *et al.*, 2013; Foss and Saebi, 2017) for the development of a BM that can be new to the company (Björkdahl and Holmén, 2013; Foss and Saebi, 2017) or an entire industry (Santos *et al.*, 2009; Schallmo and Brecht, 2010; Foss and Saebi, 2017). On the other hand, the BMI is described as the result of an innovation initiative that replaces or revises an organization’s existing BM (Mitchell and Coles, 2003; Foss and Saebi, 2017) or completely changes the existing BM (Lindgardt *et al.*, 2009). Such changes may include the value chain or the value proposition to the customer or other partners of the company (Wirtz, 2011; Matzler *et al.*, 2013). Hence, the degree of innovation is also included in discussions about BMI (Amit and Zott, 2012; Lindgardt *et al.*, 2009; Hacklin *et al.*, 2018).

For the purpose of this study, we defined BMI “as a change in a company’s business model that is new to the firm and results in observable changes in its practices towards customers and partners” (Bouwman *et al.*, 2017, p. NOS). More specifically, we were interested in examining the increasing availability and embeddedness of digital technologies such as the internet that could lead to BM changes (Bouwman *et al.*, 2017). The potential of digitalization and novel applications as well as an integrated view of the product life cycle are changing the way value is generated and new and innovative BMs are developed (Arnold *et al.*, 2016; Burmeister *et al.*, 2016; Kiel *et al.*, 2017; Loebbecke and Picot, 2015). This has also been confirmed frequently: Big Data (new data sources) (Hartmann *et al.*, 2016), automation (changed machine functions), interconnections along the value chain (breakup up of non-transparency) and digital customer interfaces create the foundations for new BMs and potentially restructure the individual sectors (Berman and Bell, 2011; Matzler *et al.*, 2016).

Several studies have also described three different ways in which digitalization influences and changes companies and their BMs: optimization of the existing BM (e.g. cost optimization); transformation of the existing BM (e.g. reconfiguration of existing models, extension of the established business); and development of a new BM (squeezing out established market participants, new products/services) (Coupette, 2015; Kaufmann, 2015; Loebbecke and Picot 2015; Ernst & Young, 2011). Matzler *et al.* (2016) and Berman (2012) described these three steps as, first, the digitization of products and services; second, digital processes and decision making with the aid of Industry 4.0, Big Data or artificial intelligence; and, third, the transformation of the value proposition and operating model as such.

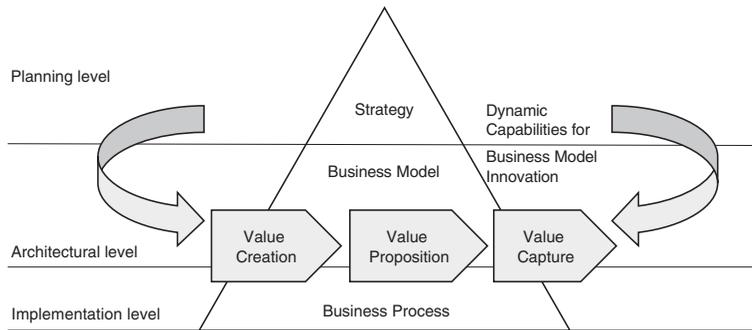
If the single BM elements and how they change is examined more carefully, the findings of the recent studies have pointed out that the value proposition, internal infrastructure management and customer relationships are mainly influenced by digitalization (Arnold *et al.*, 2016; Kiel *et al.*, 2017). Predominantly changes in the form of new offers (products, services, or solution packages in the form of cloud computing or predictive maintenance) are driving changes in the BM. As the number of offers, such as services and solution packages, increases, customer relationships are intensified. Relationships morph into long-term collaborations to satisfy customer needs. Concerning

the value configuration, the solution packages offered require the modularization of hardware and software. This requires technology development activities, especially software development. Thus, competences in cyber physical systems or analytical data processing know-how are necessary and require changes in workforce qualifications. If manufacturers do not possess these resources, they need to develop a partner network to source them externally. Furthermore, new revenue models are enabled by Industry 4.0 (e.g. dynamic pricing or pay-by-usage) but, due to customer resistance, few changes are currently taking place (Arnold *et al.*, 2016; Kiel *et al.*, 2017).

2.3 *Dynamic capabilities and BMI*

Companies can be successful over time if they can adapt to their environment. The dynamic capability is a suitable perspective that explains this phenomenon and is even more important in volatile environments. “During recent years, dynamic capability research has developed a framework outlining how firms adapt their physical, human, and organizational resource bases when facing situations of technological or market change” (Mezger, 2014, p. 430). The ongoing transition of economies, given the increasing embeddedness of digital technologies in general, can be classified as just such a change in terms of technological and markets drivers that influence a company’s BM. Schweizer (2005, p. 6) explained that a “dynamic capability can be considered as the ability to seize new opportunities and to change the existing business model by reconfiguring the value chain constellation and protecting knowledge assets, competences and (the access to) complementary assets and technologies in order to achieve sustainable competitive advantage.” Thus, companies can remain competitive if they can change their BMs (Teece *et al.*, 1997; Eisenhardt and Martin, 2000). Not only the internal capacities are central to the BM. The assessment of the BM is bound to the environmental context. In this context, the business environment is seen as a variable that can be selected and shaped by the company, but also vice versa. To increase the success of the designed BM on the market, the company must analyze various alternatives, have a good understanding of customer requirements, a precise understanding of the value chain so as to deliver what customers need as cost-effectively as possible and on time and should also have a neutral perspective on outsourcing (Teece, 2018). Hence, the ability to adapt the BM can be seen as a dynamic capability itself (Dottore, 2009). It is the learning-driven approach of sensing, seizing and reconfiguring in particular, which provides the business with opportunity to adapt and meet changing requirements in alignment with the business strategy (Mezger, 2014; Teece, 2018): first, technology and BM sensing implies both the ability to translate technological capabilities to new BM ideas and recognize alternative BMs that are in place among competitors and across industry boundaries. Second, seizing, on the entire BM level, is understood in terms of focusing on innovation activities by (re)combining elements such as technology, the market and BM knowledge. Third, reconfiguring refers to the selection and sourcing of the respective core competencies and the resources needed while also integrating partners with complementary competences and resources. Sensing capabilities are needed to identify opportunities and threats to the BM, and seizing capabilities are required to address and exploit these opportunities in the BM. Reconfiguration capabilities are needed to design and adapt organizational structures and activities and represent resources that are used to facilitate the implementation of the new BM (Dottore, 2009; Mezger, 2014).

These perspectives on digitalization and BMI taken together – in the context of dynamic capabilities – framed the conceptual setting for this empirical study (see Figure 1). Herein, the business logic triangle (Osterwalder and Pigneur, 2002) offered the perspective to differentiate between the business processes on the bottom and the strategic planning level on the top. In between lies the architectural level, which has been understood to be the BM



Source: Own illustration based on data in Osterwalder and Pigneur (2002), Mezger (2014) and Teece (2018)

Figure 1.
Conceptual setting

that represents the company’s reason for creating and capturing value by offering specific value propositions to existing and potential future customers (Teece, 2018). As such, the BM links the planning with the implementation level. The dynamic capabilities perspective offers an explorative view on the topic of BMI and has allowed researchers to argue that the design and operation of BM are dependent on a firm’s capabilities (Teece, 2018).

3. Methods and empirical setting

3.1 Sample description and data collection

The research study was explorative by nature and used an embedded multiple-case study design (Yin, 2009), whereby each of the two industries chosen constituted one case. The research was conducted at the firm level; the interviewees, representatives of their respective organizations, formed one unit of analysis (Yin, 2009). The choice of this research design was determined by the current knowledge of digitalization BMI, which implies research questions such as those presented above. In the present explorative study, the companies chosen did not constitute a representative sample but served rather to illustrate the connection between digitalization and BMI in two different industries. First, companies in the automotive industry and, second, companies in the media industry were chosen. To increase (internal) consistency and explore potential differences between different contexts, the selection was made for the following reasons: first, the companies in the automotive industry operate in B2B-markets, but the companies in the media industry are mostly active in B2C-market. Second, making a comparison between a (mainly) manufacturing and a service-oriented industry allowed the varying importance of digital technologies in the context of BMs to be contrasted. Third, this is also associated with the historical development of the embeddedness of digitalization in the two industries which form selection criteria. After the first step in the selection process had been taken, the available information on the relevant companies was collected. In a second step, appropriate respondents were selected, all of whom were either working in the top management level and had a strategic perspective on the topic or were responsible for digitalization and/or BM development in the business. In this context, we used purposive sampling to select our key informants (Flick, 2005; Teddlie and Yu, 2007) according to the interviewee’s knowledge and availability (Flick, 2005). Key informants were chosen, not because they were representative for the members of a company in any statistical sense, but because they were knowledgeable about the topic of interest and “able and willing to communicate about it” (Kumar *et al.*, 1993, p. 1634). Once the selection had been completed,

the potential interviewees were contacted. Once they had agreed to participate in the study, they received initial information about the study, including a short list of questions which they answered before the interview took place. The final sample consisted of $n = 10$ companies and $n = 12$ interviews, of which six were from the automotive industry and six from the media industry. One interview was conducted per company except in the cases of company E and J. In total, 10 out of 12 interviews were conducted personally; the rest were conducted via telephone (compare Table I). An interview guideline for the semi-structured interviews was used to ensure that similar topics were addressed and discussed in all interviews. In ten cases, the interviews were recorded and transcribed afterwards. In two cases, a careful written record was taken. The study was conducted on a broad basis in Austria and Hungary in 2017.

3.2 Data analysis

All interviews (except of two) were recorded and fully transcribed. All of the textual information served as a basis for the data analysis in the context of content analysis (Mayring, 2010). The data analysis procedure involved a summarizing technique and structuring qualitative content analysis (Mayring, 2010). The following steps were taken:

- (1) Establishment of a provisional coding scheme: the initial coding scheme was derived deductively based on theoretical considerations.

Company	Interview	Position in the company	Company size (number of employees)	Industry	Data collection
A	A1	Project management (research and development)	More than 8,000 worldwide	Automotive	Personal interview; audio recorded and transcribed, duration 15 min
B	A2	CEO	65	Automotive	Personal interview; written record, duration 28 min
C	A3	Technology management contract manufacturing	10,000	Automotive	Personal interview; audio recorded and transcribed, duration 14 min
D	A4	Head of innovation and technology	5,800	Automotive	Personal interview; audio recorded and transcribed, duration 23 min
E	A5	Head of engine IT	11,500	Automotive	Telephone interview; audio recorded and transcribed, duration 24 min
E	A6	CIO	11,500	Automotive	Audio recorded and transcribed, duration 21 min
F	M1	Head of media technology	3,000	Media	Personal interview; audio recorded and transcribed, duration 30 min
G	M2	Head of digital CC	400	Media	Personal interview; audio recorded and transcribed, duration 25 min
H	M3	Head of marketing	40–45	Media	Personal interview; Audio recorded and transcribed, duration 39 min
I	M4	CEO	25	Media	Personal interview; written record, duration 40 min
J	M5	Director of subdivision	70	Media	Personal interview; Audio recorded and transcribed, duration 34 min
J	M6	Subdivision's head of technology	70	Media	Personal interview; audio recorded and transcribed, duration 42 min

Table I.
Data sample

- (2) Paraphrasing: the original transcripts of interviews were used and paraphrased. In addition, the main text passages were translated from German into English as part of this process step and transferred to the Excel software tool. The units of analysis were defined according to the research questions, to identify relevant statements on the influence of digitalization on a firm's BM and how the firms handled the influence of digitalization on their BM and its respective building blocks.
- (3) Inductive coding of the data gathered: all interviews were coded according to the previously developed coding scheme. The coding units chosen were the single text paragraphs identified in step 2 (paraphrasing). The coding was performed first for each individual company by one team of researchers. The category system was then refined, and the results of the coding procedure were cross-checked (again) by another team of researchers. This process of coding was iterative. Meanwhile, additional, new interviews were also conducted; however, no major changes in the coding system were made.
- (4) Data analysis: after the coding, the data were analyzed by aligning the empirical results with the theoretical considerations.

The data were checked for reliability and validity to ensure the high quality of the results. In principle, the study can be repeated to generate similar results once again, since the data collection process was carefully documented, the interviews were highly structured and all data were collected in a suitable database. Internally, four (out of five researchers) were involved in coding and analyzing the relevant data, and pattern matching was employed (Yin, 2009).

4. Results

In the following section, the results from the case studies are outlined and structured according to the proposed conceptual setting as illustrated in Figure 1. Insights are provided on strategic aspects which provided a framework for the investigated industries' BMs, the influence of digitalization on the company's BMs as well as how firms coped with it. The exemplary statements provided serve as a depiction of the insights gained from an analysis of the empirical data. The results are discussed more generally in Section 5.

4.1 Case study: automotive industry

Strategic aspects. Digitalization has been interpreted by businesses as a means to fulfill customers' needs more effectively (A4), adapt to changes in the sector (A4) and increase their competitive advantage (A6). The need to adapt to changes and developments in a company's environment and achieve increasingly shorter technology cycles represented triggers for digitalization activities in companies (A1, A4). One interview respondent emphasized the strategic challenge of selecting the right technology at the right time (A1). The effects of digitalization were anticipated for a company's value chain (A6, A4) and for the value network (A6). Interview respondent A6 stated that digitalization leads to changed or new products and services. A6 added that digitalization leads to new business relations. Furthermore, respondents also indicated that digitalization influenced the company's internal structures by reinforcing interdisciplinary collaborations (A5).

BM in general. All automotive industry interview respondents perceived the influence of digitalization on the BM. Interestingly, one person (A4) perceived only minor to no influence on their core BM, whereas another interview respondent (A6) saw its influence on all areas from value creation to value proposition and value capture. Interview respondent A4 stated that digital approaches played a major role in all areas of the company. This also included their production facilities (A4). Similarly, interview respondent A2 had seen the influence of digital technologies since the early to mid-1990s.

Value creation. Beside internal initiatives, the availability of digital technologies for the company was viewed as an external trigger to use these technologies in their value creation processes (A4). All the automotive industry interview respondents seized digitalization to improve business processes (A1, A2, A3, A4, A5, A6). Interview respondent A2 also stated that digitalization supported employees during the value creation process. Furthermore, one respondent stated that digitalization could support the product development processes (A5). Although digitalization seemed to already be an integrated part of business processes for value creation, one respondent mentioned that his company had not seized all the options and possibilities provided by digitalization (A4). Respondent A4 stated the company's role as a tier-2 supplier as a reason for this.

All interview respondents mentioned the effects of digitalization on business partner networks (A1, A2, A3, A4, A5, A6). Interview respondent A1, for example, described an increased intensity in the collaboration with partners. Interview respondents A2 and A6 reported that new partners had been acquired due to digitalization. Interview respondent A3 emphasized that digitalization facilitated collaboration among partners across industry sectors (external) as well as internally between business segments, which did not compete with each other. Furthermore, two interview respondents (A2, A4) had seen the effects of digitalization on interfaces between partners and described intensified collaboration with partners who provided digitalization knowledge and services (A4, A5).

Four interview respondents (A2, A3, A4, A5) stated that digitalization required the hiring of (new) employees with digital competences, and three interview respondents (A2, A4, A5) emphasized the changing needs of competences among their employees. They either pointed out the importance of developing the competences of existing employees or acquiring new employees with the required knowledge. One interview respondent (A3) mentioned that employees need the skills to deal with digital technologies and leverage digital opportunities. Similarly, interview respondent A2 stated that digitalization requires skilled employees. A2 also added that, despite digitalization, the human workforce continues to have high relevance. Respondent A5 also mentioned the aspect of adapting the employee qualifications to meet the new requirements.

Three interview respondents (A3, A4, A6) stated that digitalization had already taken effect in their companies at various times in recent years. Interview respondent A3 mentioned that his company had already dealt with the digitalization of value creation processes before the emergence of the current Industry 4.0 hype. Similarly, interview respondent A4 mentioned that digital approaches play a major role in all areas, including production.

Value capture. Three interview respondents (A1, A3, A6) mentioned the effects of digitalization on revenues in that they saw ways to generate or improve revenues with the artefacts or results of digitalization. A1 and A6 saw a potential to generate revenues with digital products or services. Interview respondent A3 mentioned possibilities to generate revenues by using the experience gained by employees and making use of the generated data. In contrast to this, interview respondent A4 stated that the possibilities currently provided by digitalization in terms of value capture (e.g. sales platforms) are not seized in his company due to the lack of demand from the customer.

Value proposition. Five out of six interview respondents (A1, A3, A4, A5, A6) saw an influence on or enhancement of the value proposition through digitalization. Interview respondents A1 and A6 stated that digitalization led to new products or services in their businesses, whereas A1, A3, A4 and A6 saw influences on or new opportunities for the value proposition through digitalization. For example, one respondent (A1) explicitly mentioned data-driven business as a new aspect for value proposition. Three interview respondents stated that they had been using digitalization in their value proposition for several years (A1, A4, A6). Furthermore, interview respondent A6 emphasized that they believed that

digitalization will have major impact on value proposition in future. Respondent A1 also saw that challenges were imposed by short technology cycles.

Five (A1, A2, A4, A5, A6) out of six interview respondents saw an influence of digitalization on the customer contact. Interview respondents A1 and A2 saw digitalization as a lever to improve efficiency of customer contact. A2 reported that digitalization opened up new ways of customer relations via social media, for example. Furthermore, digitalization could be seized to support communication and demonstrate added values in products to customers (A5), as well as generally connect customers and sales representatives (A6).

4.2 Case study: media industry

Strategic aspects. According to interview respondents, triggers for the use of digital technologies came from both external and internal sources (e.g. pressures by large digitization providers). Furthermore, interview respondents perceived that digitalization had the potential to disrupt industries. As a concrete example, interview respondent M5 mentioned the behavior of international competitors (e.g. Netflix). Their use of technology in innovative BMs questioned the way established media companies produce and deliver value as well as their respective capabilities (M2, M3, M4). In general, beginning to use digital technologies (e.g. in data-driven BMs) seemed to require an “extensive transformation process” (M1, M2). Digitalization was also viewed as an organizational topic since the handling of digitalization required permanent structural adjustments within the company. Handling organizational interfaces (e.g. between different systems or value creation processes) was mentioned as a pressing issue in this regard (M1, M2, M6).

BM in general. Except for M4, all interview respondents in the media industry emphasized the influence of digitalization on BMs in the industry as a whole (M1, M2, M3, M5, M6), such that digitalization drives innovations and, therefore, a company’s BM (M3). According to interview respondent M1, the media industry dealt with this influence at a relatively early stage (beginning in the 1990s), and digital technologies have been used for several years (M6). Interview respondents M3 and M4 perceived options provided by digitalization as an addition to the companies’ existing BMs and did not see the need to change established BMs. However, digitalization was described as influencing the execution of these established BMs, acting more as an enabler than a driver (M4, M6). Respondent M2 recognized the potential for digital technologies to generate and capture value in the media industry, especially in the area of communication and sales (e.g. through the sale of personalized advertisements or through programmatic buying). For example, interview respondent M4 stated that digitalization influenced the customer channels of the company but left the residual BM unchanged.

Value creation. Interview respondent M1 argued that the speed in content production and the contents overall reached were major aspects that needed to be considered. Three out of six interview respondents (M1, M3, M6) saw digitalization as a way to simplify company processes, produce media content faster and increase efficiency. This could be achieved by automation of tasks, reduction of staff cost, a higher accessibility of company data or the mobile creation and distribution of media content. According to interview respondent M3, the digitalization of processes needs to be constantly questioned and developed (M1, M3, M6). Editors and journalists were cited as drivers for new or adapted content formats needed for digital publishing (M1, M2). According to interview respondent M6, identifying and satisfying customer needs (e.g. requirements regarding content and distribution channel) required heterogeneous teams. Further, interview respondent M6 explicitly mentioned that digitalization triggered a transformation process in the company that spans several years. During that time, employees were able to adjust to the new circumstances digitalization had initiated. Interview respondent M6 stated that the advantage provided by digitalization was the availability of data (e.g. in the form of digital archives). However, a major issue mentioned

related to the investigated company's digitalization activities was the handling of the necessary technological solutions (M1). An example is internet streaming of media content, which relies on a completely different infrastructure to that of conventional radio and television (M5). Realizing new possibilities provided by digitalization (e.g. personalization of content or real time automatization) particularly requires investments (M1, M6).

Two major aspects to be considered while selecting technologies are the technology cycles within the industry and the ability of a company to finance technological changes. The pace of digital development is steadily increasing, and technology lifecycles in the media industry are continuously shortening. Therefore, several respondents mentioned that one needed to take certain aspects into consideration, such as identifying appropriate technologies for the application in a company's BM, their respective technological lifecycles and the economic sustainability of a selected technology (M1, M3, M5). Furthermore, since digital processes and interfaces are partly used in critical areas (e.g. for online payments), the unfettered functionality of respective technologies needed to be ensured (M1).

All representatives of the investigated media companies recognized the importance of collaborating with internal and external partners. Interview respondents stated that this was because companies need business partners know-how and technologies to develop BMs through digitalization (M1, M2, M3, M4, M5, M6). However, while digitalization led to an intensified collaboration with some partners (e.g. mutual development-support in the area of telecommunication), relationships with other partners were terminated due to their lack of digital competences (M5).

Value capture. Most of the investigated media companies capture value through approaches like subscription models (M1), advertising and the sale of products (e.g. tickets). A special position was taken by the representatives of company J, which is limited by regulations and partly relies on fees for its income (M1, M2, M3, M4, M5, M6). Digitalization in sales and distribution was perceived to be of high importance (M4). It offers information on a company's customer groups and provides ways to tailor content to identified groups and, subsequently, to influence customer behavior (M3). As stated by interview respondent M1, opportunities offered by digitalization, such as social media platforms and personalization, were used to generate additional revenue (e.g. by extending the reach of the company's content). As stated by interview respondent M5, the use of external platforms was also considered to be critical, since companies are usually not able to generate income from content placed on these platforms. Due to the pressure resulting from decreasing profit margins, investments in digital technologies were perceived as attractive (M1). However, according to interview respondent M4, the advantages of digitalization in company processes must be clear in advance in order to implement digital technologies. Interview respondent M5 indicated that customers are increasingly demanding flexibility in terms of the delivery of content. In that regard, digital technologies were considered to be a means to meet customer requirements toward content (M5, M6). Digitized approaches in the distribution of media content were considered to hold merits for consumers, advertising partners and the company itself through increased revenues (M1, M2, M3, M4).

Value proposition. The representatives of the investigated companies indicated that they were driven by their media content and showed a tendency to choose content quality over actuality (M1, M3). Interview respondents recognized that, by publishing content via digital channels, their companies became more accessible and they potentially created additional value for customers. Examples that were collected for the generation of additional value through digitalization were the personalization of published content for advertising purposes (M1, M2, M3) and the use of real time data (M3) (e.g. traffic information). Digital technologies were cited as being utilized to intensify customer contact, for example, to provide feedback options for customers on delivered products and services (M1, M2, M3, M5, M6).

Interview respondent M6 underlined the influence of customer groups. A challenge that was identified in that regard was to supply different customer groups with tailored content. Digital technologies enabled firms to offer customers the possibility to choose both the content itself and the way the content could be consumed (e.g. through publishing content on multiple platforms) and were subsequently able to address multiple customer groups. The main issue, according to interview respondent M6, was the interfaces within a company and to the customer. Another aspect that was mentioned by interview respondents M1 and M5 was the secure handling of personal data and the strict implementation of legal regulations (M1, M2, M5, M6).

5. Discussion

5.1 Influence of digitalization on BMs in the automotive and media industry

Results indicate that the value creation aspect is strongly influenced by digitalization in both the automotive and the media industry. Pressing issues are, thereby, the firms' processes and their partner structures. Respondents saw an influence through altered requirements regarding employee qualifications. Furthermore, respondents perceived the positive effect of digitalization on the value proposition and value capture aspects, which resulted in improved and additional revenues. However, the degree of digitalization applied by each firm was determined by the customer demand. This result also resonates the findings of Linz *et al.* (2017) and Berman and Bell (2011), who said that the customer is the main driver behind digitalization. Moreover, respondents from both industries indicated that the influence of digitalization would challenge existing technologies, for example, through shorter technological innovation cycles. Based on their perceptions of the current effects of digitalization, our respondents anticipated that digitalization would have a major impact on their firms' future value propositions. These findings are also supported by those of studies such as Arnold *et al.* (2016) and Kiel *et al.* (2017). In their studies, they identified that the value proposition was mainly influenced by changes in the offers. Companies increasingly added services to the physical products (e.g. predictive maintenance) or offered complete solutions. Matzler *et al.* (2016) and Berman (2012) also described changes in the offers and, thus, in the value propositions as being the first step taken toward a digital BM.

Data collected from representatives of the automotive industry indicated that the influence of digitalization on various aspects of value creation was perceived as the industry's dominant theme. For example, production process optimizations were frequently cited by the interview respondents. This may be because the companies to which the interview respondents belonged are mainly engaged in B2B-markets. Furthermore, the automotive industry is mainly engaged in Industry 4.0 projects, placing a focus on the optimization of value creation (Bauernhansl *et al.*, 2015; Kiel *et al.*, 2017). Companies recognize that they need to manage the connection between the physical and the digital world in the context of Internet of Things before they offer digital services to customers (Fleisch *et al.*, 2014). This aspect of the BM has been assigned a higher priority than other aspects, such as customer relations, in the value capture area. According to our respondents in the automotive industry, the influence of digitalization on their firms' value propositions affects their products and services. In that regard, data-driven add-on BMs and new ways of customer contact were explicitly mentioned.

In the media industry, digitalization affected the value creation through adjusted processes for content generation as well as the need for technological reconfiguration. However, in contrast to the automotive industry, respondents thought that digitalization had a strong effect on value proposition and value capture aspects of the BM. Opportunities provided by digitalization were used to exploit aspects such as the personalization of

services offered, digital platforms and improved customer orientation. This may be because the media industry has a strong business to customer focus, causing the companies to place a greater emphasis on value proposition and value capture aspects. Another further reason is the early influence of digitalization on the media industry and the necessity to deal with that fact. These findings are also supported by Bourreau *et al.* (2012).

5.2 Similarities and differences in coping with digitalization between investigated industries

Respondents from both industries mentioned external and internal drivers for digitalization. External drivers such as available technologies or the shortening of technology lifecycles were cited as relevant for the media and automotive industries. These findings echo those of Bouwman *et al.* (2017), who concluded that “internal drivers related to innovative activities and strategy, as well as technology turbulence, play an important role when social media and Big Data are part of business model innovation” (Bouwman *et al.*, 2017, p. NOS).

Mezger (2014) revealed that the businesses’ sensing capabilities are important for detecting technological and market developments, while analyzing BMs in other industries helps to learn about the problems and challenges to be faced. Seizing capabilities are reflected in transformative and exploitative learning processes by re-combining knowledge about customers, markets and technologies used to develop the new BM. Sensing and seizing capabilities are characterized by their high degree of interaction. The reconfiguration capability requires companies to change their activity system, structures and governance. Decisions about new resources must be made, and the replacement of existing ones is important. These points stress the need for capabilities to integrate partners into the BM.

The findings clearly underline the need for companies to have the sensing capabilities described by Mezger (2014). Furthermore, opportunities in areas such as process optimization were mentioned as internal triggers by members of both interview groups. The aspect of the add-on business can be identified in both the automotive and the media industry, as explained by Fleisch *et al.* (2014). This result is in line with those of Coupette (2015), Kaufmann (2015), Loebbecke and Picot (2015) and Ernst & Young (2011), who stated that the effect of digitalization can present itself in the form of a reconfiguration or extension of the established BMs.

Furthermore, representatives of both industries recognized the potential of digitalization to optimize their BMs, as described by Coupette (2015) and Kaufmann (2015). However, our results indicate that the influence of digitalization on BM elements and, therefore, the potential for optimization depends greatly on the company’s industry. Furthermore, in the automotive and media industries, the influence of digitalization questions the existing organization, interfaces, infrastructure and capabilities. While Mezger (2014) concluded from his findings that managers could facilitate BMI by focusing on the BM level rather than “addressing new technological possibilities and changing customer needs by well-known product and process innovation routines” (Mezger 2014, p. 445), our data did not allow us to clearly differentiate between the different organizational layers and respective innovations. From a capability perspective, however, the aspect of skills required by digitalization was evident to representatives of both industries. Interview respondents frequently pointed out challenges in the area of employee recruitment and qualification. The ability to build and create the know-how required to seize digitalization opportunities was seen as highly relevant. This was also revealed by the findings of the study conducted by Arnold *et al.* (2016) as well as Kiel *et al.* (2017). They highlighted the importance of businesses possessing additional competences and know-how in order to offer new services or solution packages, respectively. Saebi (2014) stated that companies need to develop dynamic capabilities to be prepared for changes in their BMs. She identified the preparedness to change BMs and overcome rigidities in the existing BM as “business model change capability” (Saebi, 2014, p. 17). If this idea is taken one step further, the BMI requires meta-capabilities in the form of innovative adaptive capabilities, as described by Collis (1994), since the way of doing business is altered and, subsequently, dynamic capabilities are also altered.

Table II provides an overview of the BM elements in investigated industries and the allocation of these elements to dynamic capabilities phases. Aspects regarding investigated companies' BMs are structured according to the proposed framework in Figure 1.

Business model elements (1)	Dynamic capabilities (2)		
	Sensing	Seizing	Reconfiguring
<i>Automotive</i>			
Value proposition	Identify possible new/adapted products and services Investigate digital options to improve communication with customers	Adapt toward digital products and services Realize possibilities to improve customer contact	Introduce new (digital) products or services Enhance the existing value proposition Use communication with customers to demonstrate added values
Value creation	Identify necessary employee qualifications Investigate options to support product development processes	Adapt employee competences Support of product development processes Establish collaborations across industry sectors and between companies' business segments Change partner structure and scope of collaboration	Continuous use of adapted employee qualifications Use of established business relations and interdisciplinary collaborations Use digitalization to improve business processes, support employees in the value creation and product development processes
Value capture	Identify digital possibilities to capture value	Adapt digital technologies to create revenues with digital products and services	Generate additional or improve existing revenue streams using digital technologies
<i>Media</i>			
Value proposition	Identify options to increase speed of generation and reach of media content Identify options to supply different customer groups with tailored content	Personalize media content and channels Use of personalization for advertising purposes Use digital technologies to ensure data security Use of digital channels to increase content accessibility	Introduce new (digital) products or services Enhance the existing value proposition Use of digital technologies to intensify customer contact Use of digital technologies to constantly adapt to customer needs
Value creation	Identify necessary employee qualifications Identify the need for new/adapted media content formats Identify options to increase flexibility in content delivery	Adapt employee competences Introduce new/adapted media content formats Utilize higher accessibility of data Personalization of content Real time automation of processes Simplify/automate processes Change partner structure and scope of collaboration	Use new/adapted media content formats Mobile creation and distribution of media content
Value capture	Identify possibilities to react to low profit margins	Adapt to content platforms and personalization to generate additional revenue	Constant collection of information on customers Use data to understand customer behavior

Table II.
Influences of digitalization on BM elements and their associations with dynamic capabilities

6. Conclusion

The findings of this research have contributed to the literature on BM and digitalization. Recent theoretical approaches were applied to explore digitalization and BMI. As a sample, representatives of the automotive and media industry in Austria and Hungary were chosen and took part in semi-structured interviews. By offering their practical examples and insights, these representatives outlined the influence of digitalization on BMs. The opportunities and challenges companies perceive when changing their BMs, for example, by using digital technologies was discussed. Furthermore, this discussion shed light on how the investigated industries have coped with the influence of digitalization, pointing out and comparing similarities and differences in their behavior toward BMI. This information, taken together, represents a valuable, highly relevant contribution to a field that lacks an empirical foundation.

As with any research, this study also has its limitations. The main limitation of this research was the restricted number of informants included in each case study. In this respect, more insights could be gained in the future by conducting a study with more respondents or diversifying the sample, taking more organizations into account. In general, further analyses are certainly needed to determine the importance and influence of digitalization concerning company strategies and BMs. This is a complex topic both from a theoretical and a practical point of view, and one requiring more detailed study.

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