The impact of digitalization on business models

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The Impact of Digitalization on Business Models

Abstract

Purpose: This paper explores how digital technologies have forced small-to-medium-sized enterprises (SMEs) to reconsider and experiment with their business models (BM$s$) and how this contributes to their innovativeness and performance.

Design/methodology/approach: An empirical study was conducted on 338 European small-to-medium-sized enterprises (SMEs) actively using social media and big data to innovate their business models. Four in-depth case studies of companies involved in business model innovation were also carried out.

Findings: Findings show that the use of social media and big data in business model innovation is mainly driven by strategic and innovation-related internal motives. External technology turbulence plays a role too. Business model innovation driven by social media and big data has a positive impact on business performance. Analysis of the case studies shows that business model innovation is driven by big data rather than by social media.

Research limitations/implications: Research into big-data- and social-media-driven business models needs more insight into how components are affected and how SMEs are experimenting with adjusting their business models, specifically in terms of human and organizational factors.

Practical implications: Findings of this study can be used by managers and top-level executives to better understand how firms experiment with business model innovation, what affects business model components, and how implementation might affect business model innovation performance.

Originality/value: This paper is one of the first research contributions to analyse the impact of digitalisation, specifically the impact of social media and big data on a large number of European SMEs.

Keywords: big data, business model innovation, digitalization, social media

Paper type: Research paper

1. Introduction

Attention to business model innovation (BMI) is increasing both in entrepreneurial practice and in research (Zott and Amit, 2010). In this paper, the concept of business model is defined as the business logic to create and capture value for both consumers and businesses. In other words, it refers to the way a single organization or a network of firms collaborates at strategic and operational levels to bring products and/or services (bundles) to the market. A single organization or a network of firms makes use of technical platforms and architectures to create and capture value for both the (networked) organization and the customer (Bouwman et al., 2008). Business model innovation is defined as a change in a company’s BM that is new to the firm and results in observable changes in its practices towards customers and partners. The focus of our research, however, is how companies and specifically SMEs experiment with BMs as a result of digital transformation, specifically with regard to social media and big data. Business model experimentation is defined as activities related to discussing and trying out changes in BMs carried out by a manager or a team with a budget specifically allocated for BM experimentation. In this paper, we focus on BM practices, defined as the way the team in charge of the experimenting process makes the transition from strategy to BMs in practice through digital transformation. It is about how strategy is actually implemented while experimenting with social-media- and big-data-driven business models.

Much research attention has been devoted to SMEs, which are considered to be the driving force in most economies. Research has had very diverse foci, such as industry, size, phase of maturity, and ownership. It is often emphasized that SMEs are responsible for much of the employment, innovation, and growth in national economies, as indicated by the OECD, European Union, and
national governments. Therefore, SMEs and changes in their BMs are important to study. From telecommunications, information technology (IT), and information systems (IS) perspective, innovations such as social media and big data are important topics of study. Social media can offer an extra channel to communicate with customers, but it can also be developed as a service in itself. In the same way, big data can affect SMEs’ business models, not only in relation to marketing but also to business processes. For instance, in the Industry 4.0 domain, monitoring production and production quality affects many SMEs’ BMs. BMI is not about optimizing internal processes or incorporating and implementing new technologies in an organization; innovation has to affect the core business logic of SMEs and be observable to others.

Advanced technologies such as social media and big data are considered to play a core role in BMI in most firms, and therefore also in SMEs. However, what drives BM innovations based on digital technology, and how experiments with BMI affect performance is, to our knowledge, not yet researched. Therefore, in this paper the main questions are: how digital technologies, specifically social media and big data, have forced SMEs to reconsider their BM? and how BMI mediates the impact of digital technologies on innovativeness and performance?

In the context of the H2020 Envision Project, quantitative data were collected and case studies of BMI as executed by SMEs were carried out. Based on a mixed-method approach, a dataset of 338 European SMEs engaged in BMI related to social media and big data was analysed, and a number of in-depth case studies were performed. The quantitative dataset is a subset of a larger sample of companies engaged in BMI (N = 586). Data were collected in 2016. The conceptual model under investigation relates to BM incentives and BM experimentation with (subjective) performance indicators. Several sample cases in which social media and big data (analytics) affect BMs were conducted to deepen the insights obtained from the quantitative data.

In the next section, mainstream business model factors from extant literature are drawn to build our research model. In Section 3, based on the discussion laid out in Section 2, the research hypotheses are developed. Section 4 discusses the research methodology, data collection process, and the measurements development, followed by research results in Section 5. Section 6 presents the discussion of findings. Section 7 outlines the research’s theoretical contributions, conclusions, limitations, and considerations for future work.

2. Theoretical Background

Here, we briefly discuss some main concepts from business model innovation literature. Traditionally, research on business models can be categorized into three main areas: (a) the use of Internet, mobile, and information technologies on an infrastructure and its application level (Bouwman et al., 2008); (b) strategic issues concerned with firm performance and value creation (Casadesus-Masanell and Ricart, 2010; Hedman and Kalling, 2003; Methlie and Pedersen, 2007; Teece, 2010; Zott and Amit, 2008, 2010); and (c) innovation and technology management (Chesbrough, 2010, 2006; Waldner et al., 2015; Zott et al., 2011). With the aim of not replicating existing BM literature reviews (Lambert and Davidson, 2013; Zott et al., 2011), our focus is limited to empirical studies on BMI. BM innovation is defined as businesses’ change in their logic for creating and capturing value. BM change needs to be evident for stakeholders, including customers and/or end-users, and is often explicit due to change in BM components. BM components are the building blocks of a BM, such as value proposition, activities of actors supporting the ecosystem, pricing or
revenue model, and risk attribution. Studies of BMs are mostly based on cases, specifically in the domain of Internet, mobile, and information technologies (Ballon, 2007; Bouwman et al., 2008). Extant quantitative studies are within the strategic and innovation management domain. From these studies, conceptual papers on entrepreneurship (Doganova and Eyquem-Renault, 2009), strategic management (Zott et al., 2011), or IS literature (Schneider and Speith, 2013), as well as empirical papers on BMI and performance (e.g., Aspara et al., 2010; Aziz and Mahmood, 2011; Clausen and Rasmussen, 2013; Huang et al., 2012) have often unclearly defined BMs and BMI (Foss and Saebi, 2017). Although we agree with Wirtz et al. (2016) that BMI requires a crucial transformation of the existing value proposition and/or value constellation, the problem is that core characteristics, components, or concepts of the value constellation are often ambiguously defined, depending on the specific ontology used (e.g., Hartmann et al., 2016; Souto, 2015). Some authors, for instance, offer a rather arbitrary list of components (Hartmann et al., 2016). These components are unrelated to other concepts such as value proposition, customer segment, and key partners as used in business model CANVAS (Osterwalder et al., 2005). There are other components such as service, technology platform/architecture, ecosystem, and finance and risk-related uncertainties, as used in the STOF (service, technology, organization, and finance) model (Bouwman et al., 2008); as well as components such as interface or service platform, proposed by the VISOR (value proposition, interface, service platform, organizing model and revenue) model (El Sawy and Perreira, 2013). The disagreement about what a BM is reflects also on the definitions of what BMI entails; thus, definitions in empirical papers are unclear or not provided. Some authors use revenue models as synonymous with BMs (Aspara et al., 2010; Aziz and Mahmood, 2011; Brettel et al., 2012).

Our approach is in line with Osterwalder et al. (2005) and Wirtz et al. (2016) that define BMI as the result of the rearrangement of a BM’s components. Some authors such as Bucherer et al. (2012), Bonakdar (2015), Hartmann et al. (2016), and Frankenberger et al. (2013) follow also this view and define BMI as the deliberate modification of one or more firm’s core components, or the introduction of new components. Björkdahl and Magnus (2013) stress that BMI can be the result of new combinations of new and old products or services, as well as changes in the firm’s market position and process management. Lindgardt et al. (2009) focus on value delivery and define BMI as the reinvention of two or more BM components that can lead to novel ways of value delivery. The definition of Amit and Zott (2011) suggests that BMI can be the adoption of novel activities that define the BM of a firm, the adoption of new linkages between existing activities, or the replacement of business actors in the firm’s value network.

Most studies are vague about how core concepts are measured (Aziz and Mahmood, 2011). Velu (2016) considers diversification/product launch and external funding as two indicators of BMI. Others use dummy variables for consulting BM, technology BM, software BM, etcetera (e.g., Clausen and Rasmussen, 2013). Kim and Min (2015) define BMI simply as adding online retail activities. Souto (2015) uses unspecified two-item scales. Huang et al. (2012) use a random list of components as indicators. Clauss’s (2017) valuable paper focuses on developing a validated scale for BMI.

Moreover, the data used in empirical studies show some limitations. Some studies make use of the European Common Innovation Survey data as a proxy (Barjak et al., 2014; European Union, 2017) or data from existing databases (Cucculelli and Bettinelli, 2015; Hartmann et al., 2016; Kim and Min, 2015). Original data are seldom collected. Therefore, there is great diversity conceptually, both at the definition and operational levels, as well as in the use of data collected for other reasons.
In general, empirical studies are drivers in their research focus, based on strategic management perspectives and linear econometric data analysis (e.g., Cucculelli and Bettinelli, 2015; Guo et al., 2015, 2013; Hartmann et al., 2016; Kim and Min, 2015; Zott and Amit, 2007). Performance is the key dependent variable and, most of the time, linear regression analyses are used; some studies apply structural equation modelling.

It can be concluded that research on digital transformation and business model innovation is still rather scattered and sometimes lacks depth in understanding what BMI implies, what its antecedents are, and how it affects firms’ performance and innovativeness. Moreover, to our knowledge, only research by Barjak et al. (2014) specifically addresses SMEs. Therefore, a generic BMI model taking into account antecedents of BMI as well as outcomes is developed and tested. Literature on BM and BMI in relation to the role of social media and big data is limited. The focus of this paper, therefore, is on the relation between these technologies and BMs. Publications on the relation between social media and business models are industry-specific and relate to smart tourism, media, or health care. Social media are often associated with new digital channels. The wide use of digital media, and especially of social media, led to the generation of big data that, according to several studies (e.g., Fosso-Wamba et al., 2015; Jin et al., 2015), can be analysed and used to create relevant information for businesses.

3. Hypothesis development

The overall leading theoretical model (Figure 1) posits that both internal (innovation activity and strategy) and external (competitiveness intensity and technology turbulence) factors directly influence business model experimentation. This paper proposes that business model experimentation—discussing and trying out changes in BMs—positively influences business model practices, that is, the transition from strategy to BM in practice. In addition, this paper proposes that business model practices positively influence both innovativeness and overall business performance of a firm. Finally, this paper proposes that innovativeness influences overall business performance. These concepts are introduced in the following subsections.

Innovation activity in an organization is defined as all the activities undertaken by a company to add value to its products and services. Therefore, the use of technologies such as social media and big data—which are perceived as innovative in themselves by most SMEs—can affect BM experimentation. An internal driver like innovative activity, when explicitly pursued by the firm (Hurley and Hult, 1998; Utterback and Abernathy, 1975), is expected to lead to experimentation and therefore, budget allocation and team activities in relation to BM will be supported. Companies that score high on innovation—whether it is product, marketing, or organizational innovation—are generally expected to be prepared to experiment with their BM. This will also be the case when technologies such as social media and big data are considered.

H1: Innovation activity has a direct effect on business model experimentation.

Strategy is a concept that is often associated with business models or business planning. BMs involve the implementation of a strategy in the business logic on a more operational level. Therefore, an orientation towards strategic decisions in a firm will enable their implementation in the BM, and therefore, BM experimentation will be relevant (Casadesus-Masanell and Ricart, 2010; Chesbrough,
2010; Chesbrough and Rosenbloom, 2002). Openness to discussion on strategy will translate in SME’s experimentation with its BM.

**H2:** Strategy has a direct effect on business model experimentation.

Competitiveness intensity of a company defines its position in the business ecosystem and shows how it manages to compete with its rival companies. The more competitive the external environment is, the more discussions on what to do on a strategic as well as a BM level will be initiated (Carayannis and Provance, 2008; Casadesus-Masanell and Ricart, 2010; Pauwels and Weiss, 2008).

**H3:** Competitiveness intensity has a direct effect on business model experimentation.

Technology turbulence has a direct effect on business (Johnson et al., 2008). The evaluation and advancement of technological innovations over the last decades have been the fastest growing trend in business in recent history. SMEs have to adjust to IT applications continuously and therefore will try to find out how new technologies affect their BMs. Moreover, they will experiment with IT applications and what they could mean for their BMs. This is also true, *ceteris paribus*, for new IT applications like social media and big data.

**H4:** Technology turbulence has a direct effect on business model experimentation.

Business model experimentation entails all the activities that a company conducts and supports in terms of changes to its business logic. Although there has been discussion in the literature in relation to a focus either on incremental change in parts of the BM or radical overhaul, the focus of this paper is on enabling experimentation by allocating budget to teams engaged in experimentation, and the management of those teams, without focusing on the kind of experimentation carried out.

**H5:** Business model experimentation has a direct effect on business model practices.

The concept of business model practices involves the way the strategy of the company is expressed in its BM and the way that strategy is implemented. Innovativeness is seen as a dependent variable that represents the overall innovative output of the firm. Therefore, the more a SME transfers strategy to its BM, the more innovations it will be able to spin out.

**H6:** Business model practices have a direct effect on innovativeness.

Business performance can be significantly affected by BM practices, as firms that are more focused on BMI outperform firms that do not, in terms of profit (Giesen et al., 2010, 2007). Also, the IBM CEO study reported that CEOs from top firms acknowledge the impact of BMI on the operating margin growth in their companies (Pohle and Chapman, 2006). BMI has become one of the three main foci of innovation for these CEOs to improve their firms’ business performance. By innovating their business models, firms can also gain competitive advantage, as business models might be hard to replicate; thus, this allows firms to continue being profitable (Chesbrough, 2006). Market share of a small–medium firm or start-up can also be positively affected by BM practices as a novel business model can recombine existing internal resources or use external partners’ resources (Zott and Amit, 2007).

**H7:** Business model practices have a direct effect on the overall performance of a company.
It is clear that innovation output will also affect the overall performance of a firm. Innovation can have a positive effect on business performance as it can enable firms to develop competitive advantage (Hult et al., 2004; Hurley and Hult, 1998). Firms willing to innovate will focus on activities that give them better capacity to do so (Hurley and Hult, 1998). This willingness to innovate is mainly driven by market, learning, and entrepreneurial orientation (Hult et al., 2004). This orientation drives firms to improve continuously in order to adapt to the constantly changing market, which, if their competitors cannot keep up, will give them a competitive advantage and improved business performance. Hence, we propose the next hypothesis.

**H8:** Innovativeness has a direct effect on the overall performance of a company.

With the above-defined concepts and how they affect the overall performance of a firm, the following research model is proposed to be tested via empirical research (Figure 1).

**Please insert Figure 1 here:**

### 4. Research Methodology: Quantitative Data

In this section, the method used in this study to examine and evaluate the proposed research model is elaborated. Based on the above discussion, empirical research is performed to examine how digitalization enables firms to change or innovate their current business models.

#### 4.1. Developing a Measurement Model

To ensure the reliability of the measurement and to have a comprehensive list of measures, an extensive review of existing literature on several disciplines such as entrepreneurship, strategic management, and business models was executed. All survey items for each latent construct were selected from previously validated measures. Data were collected on internal and external drivers, type of innovations, how BM change is managed, BM changes made, familiarity with and use of BM ontologies and tools, and performance and background characteristics. The overall performance of the firm was measured subjectively according to Venkatraman and Ramanujan’s (1986) proposed model. Due to ethical concerns, merging the firms’ data with data from statistical offices to use objective reported performance information could not be done. McDermott and Prajogo (2012) suggest that use of subjective measures of performance is a valid proxy for objective performance measures.

Sales volume and revenue growth were used as control variables. Next, Likert-type scales were used (1 = *totally disagree*, 7 = *totally agree*) based on well-known studies on innovation, entrepreneurship, and strategic management with regard to firms’ BMs (Subramanian, 1996; Zott and Amit, 2008; see also Table 1).

To find and identify the relationship among constructs, the dataset was analysed using structural equation modelling (SEM) techniques. SEM is especially applicable when dealing with relationships among constructs such as in business model experimentation and subjective assessment of overall business performance. The purpose of covariance-based SEM is to “reproduce the theoretical covariance matrix, unlike the PLS-SEM which focuses on improving the explained variance” (Hair et al., 2011, p. 139). In this paper, partial least squares (PLS-SEM) method, which is a component-based estimation, is used. Table 1 provides a list of the items used.
4.2. Survey Administration, Sample, and Data Collection

The questionnaire contains several concepts related to BM and BMI, as laid out in the theoretical section of this article. The questionnaire starts with a generic selection question, asking if the company under study has changed its BM in the last 24 months. Next, four specific selection questions were posed giving examples of BMI related to (a) value proposition and market; (b) ecosystem; (c) information technology, that is, use of social media and/or big data; and (d) pricing and related financial issues. The third question was used as a selection question to obtain a subsample of 338 SMEs involved in social media and big data. These questions were included to make sure firms were actually involved in BMI (Langerak et al., 2004; Lee and O’Connor, 2003). Next, the key respondent from each firm had to prove that he/she was knowledgeable about BMI practices in their company (Atuahene-Gima, 2005).

The questionnaire was iterated and pretested, reading it aloud to managers and academics to improve clarity of questions. The questionnaire was developed in English and then translated into 11 languages (i.e., Dutch, French, Finnish, German, Italian, Lithuanian, Polish, Portuguese, Slovenian, Spanish, and Swedish). The German questionnaire was used for Austria. In order to detect potential problems (e.g., ambiguous expressions) and cultural issues, back-translation of the questionnaire into English was performed to ensure translation did not introduce any bias in the measures. Moreover, a final check on translations and consistency between them was made by a research agency. The questionnaire was pretested in every one of the 11 countries.

Data was collected through a professional research agency based in the Netherlands. This agency has extensive experience in data collection in multiple countries. They use native speakers and computer-assisted telephone inquiry. The countries included in this research are spread over Europe and contain, for all European regions (North, West, Central, South, and East), a large country with a large number of SMEs and a small country. Quota for micro, small, and medium enterprises was established as 33%, −33%, and −33%, respectively. There is no quota defined for industry sectors. Agriculture, public administration, and nonmarket activities in households are excluded in this paper. The sample was based on Dun and Bradstreet database. Dun and Bradstreet collects data on companies, their executives, industry classification, and contact information on a regular basis from chambers of commerce and other organizations. Companies were randomly selected from the database and key respondents (owner or BMI manager) were interviewed. Identification data were not known to the researchers. The research agency also took into account the incidence rate that provides the hit rate, that is, the number of times a company is asked if they are involved in BMI before finding one that fulfills this requirement. Results obtained showed similarity patterns between countries. As a further test, respondents’ suitability (Atuahene-Gima, 2005) to answer the questionnaire and their degree of knowledge (1 = very limited knowledge, 7 = very substantial knowledge) regarding the product/service on offer, business process, and new product/service development was assessed. Mean responses were 6.7, 6.6, and 5.9, respectively, which indicates adequate knowledge levels.

5. Data Analysis and Results
5.1. Validity and Reliability
Composite reliability (CR) test examines internal consistency and reliability of latent constructs. CR threshold is 0.70 or higher. More specifically, value between 0.60 and 0.70 is recommended in exploratory research, and between 0.70 and 0.90 in other stages of research; value under 0.60 is seen as lacking reliability (Hair et al., 2011; Nunnally and Bernstein, 1994). Table 2 shows that each construct satisfied the recommended value and indicates that all constructs have reliability.

Cronbach’s alpha is a common test for internal reliability of latent constructs (Bryman and Bell, 2011) and it is recommended to be higher than .70 (Hair et al., 2011; Urbach and Ahlemann, 2010). Statistics from Table 2 show that reliability of all constructs, except for one (strategy), is satisfied.

Convergent validity is presented by average variance extracted (AVE) and should be higher than 0.50 (Hair et al., 2011). All of the latent constructs in Table 2 have sufficient convergent validity: AVE > 0.649. Factor loading accounts for undimensionality of measuring items (Awang, 2012). The value of factor loading for an established item should be 0.6 or higher. It is necessary to remove items from the measurement model if their factor loadings are low, one item at a time. The remaining eligible items, listed in Table 2, show acceptable convergent validity, internal consistency and reliability of measuring items, and are all consistent with the recommended threshold values.

Please insert Table 2 here:

5.2. Discriminant Validity

Assessing discriminant validity is a building block of model evaluation (Hair et al., 2010). Discriminant validity guarantees the uniqueness of a measuring construct and indicates that the phenomenon of interest is not captured in other measures (latent variables) within the research model (Hair et al., 2010; Henseler et al., 2015). This paper uses both Fornell–Larcker and heterotrait-monotrait ratio (HTMT) criteria for discriminant validity assessment. Table 3 shows that AVE value satisfies the constraints and shows that the constructs as well as the measuring model are adequately discriminated.

The second criterion for discriminant validity assessment, HTMT, is generally used for assessing discriminant validity in PLS-SEM. However, literature on PLS-SEM shows that scholars predominantly use the Fornell–Larcker criterion and cross-loadings for discriminant validity assessment in variance-based structural equation modelling. The classical criterion (i.e., Fornell–Larcker criterion) for discriminant validity assessment requires the square root of AVE to be greater than the correlation of the construct with all other constructs in the structural model. For example, the square root of the AVE is 0.74, however, if the correlation between constructs C1 and C2 is 0.80, it can be concluded that discriminant validity has not been established.

Please insert Table 3 here:

HTMT is an alternative to the classical criterion for assessing discriminant validity. Monotrait-heteromethod is the correlation of indicators measuring the same construct and heterotrait-heteromethod is the correlation of indicators across constructs measuring different phenomena. HTMT value close to 1 indicates lack of discriminant validity, however, some authors such as Henseler et al. (2015, p. 129) suggest a conservative value of 0.85 for HTMT and a more liberal value of 0.90. According to this recommendation, if HTMT values are less than 0.85, one can establish that
discriminant validity is not an issue. Table 4 shows that HTMT values satisfy even the more conservative criterion, as all the values are below 0.85.

5.3. Structural Model Analysis

To test the hypotheses and figure out the statistical significance of the path coefficients in the research model, structural equation modelling (SEM) was used. The fit of the model is satisfactory, chi-square ($\chi^2$) = 669.87 and degree of freedom (df) = 216. The overall performance is explained by a variance of 15%, innovativeness is explained by a variance of 20%, and business model experimentation and business model practices are explained by variances of 28% and 27%, respectively. Figure 2 shows the relationships between constructs in the model, bold lines represent significant relationships and dotted lines show insignificant relationships or unsupported hypotheses. Six different fit statistics—root mean square error of approximation (RMSEA), goodness-of-fit index (GFI), adjusted GFI (AGFI), normed fit index (NFI), Tucker–Lewis index (TLI), and comparative fit index (CFI)—were computed. These model fit indices satisfy the recommended guidelines and show that our research model has a good fit with the data (Browne and Cudeck, 1993; see Table 5).

5.4. Hypothesis Testing

Different alternative models were tested, and the model presented in Figure 2 is the optimal model and fits best the data. Table 6 shows the research hypotheses and analysis results. The results reveal significant relationships between innovation activity ($\beta = 0.26$, $p < .001$) and strategy ($\beta = 0.23$, $p < .001$) with business experimentation, thus, H1 and H2 are respectively supported in the model. The results show that there is no significant relationship between competitiveness intensity (H3) and business model experimentation, and thus H3 is not supported in the model. The analysis shows that technology turbulence drives BM experimentation and reveals a significant path ($\beta = 0.17$, $p < .001$), thus, H4 is supported in the model.

Moreover, the results show a significant path between BM experimentation and BM practices ($\beta = 0.52$, $p < .001$), and thus, H5 is supported in the model. A strong significant relationship between BM practices and innovativeness is observed ($\beta = 0.44$, $p < .001$), thus, H6 is supported in the model. Business model practices also have a significant relationship with overall business performance ($\beta = 0.21$, $p < .001$), thus, H7 is supported in the model. Finally, analysis shows that innovativeness has a significant relationship to overall business performance ($\beta = 0.24$, $p < .001$), and thus, H8 is supported in the model.

5.5. Case Studies

This research is based on a case study approach (Yin, 2013). Since research into BMI in the context of SMEs is a new phenomenon, our approach is relatively inductive. As part of a large European project, a database of 85 BMI cases in SMEs was built. To collect the data, a common case study protocol was
used, which is available on request and which includes SMEs relevant to the sample, information collected, and how data from different sources (triangulation) were used. Data sources include interviews, relevant documents, and business model descriptions and/or pictures. Data were structured according to an existing template (case study protocol) that contains information on topics such as:

- Background characteristics of the firm (information sheet).
- Validation of interviews by interviewees and case reviews by other researchers involved in the project.
- Assessment of the firm’s strategy focus and innovativeness.
- Information on factual R&D information (if available) and market focus.
- Information on the value proposition and business model (innovation).
- Information on the impact of BMI on the business logic and business performance of the firm.

Depth and detail of case descriptions vary. Due to the diversity of SMEs in terms of size (from very small to medium-sized), industry (from personal services and retail to high-tech industries), maturity (from start-ups to well-established family businesses with more than 300 years of experience), and country within Europe, a wide range of information is available. Moreover, the cases deal with a diversity of topics such as new pricing strategies for a pastry shop, the impact of servitization on the BM of a mechanical engineering firm, and BM design for social innovation in healthcare. Thus, most of the cases are not related to digital transformation. From the total set of cases, we selected four with a clear focus on business model in combination with social media or big data in order to enrich the quantitative results with more in-depth insights. Theoretical sampling was used to select our cases based on two dimensions, the first of which is the technology at stake—social media or big data—and the other is whether the companies were users or producers of social-media- or big-data-based applications (see Table 7 for information on the cases).

Please insert Table 7 here:

5.6. Case Study Results

1. This case is about a Spanish family business with multiple hamburger restaurants in Madrid. The second generation of owners is pushing BMI by making use of social media. The first restaurant was opened in 1981 and is a typical American-style hamburger joint venture. Food ratings are very positive and any negative reviews focus on poor service. The owners rely strongly on a loyal customer base. The restaurant has a social media manager who uploads 3–4 posts per day. Social media use is not focussed on interaction with customers, but only on promotions. Based on analyses of reviews on Facebook, Twitter, and other channels such as Instagram and Foursquare, the problem of the company is mainly related to service delivery. For instance, there are long queues for the restaurant due to its poor reservation system, which relies on telephone and website reservations. People have to wait up to 1 hour even if they made a telephone or online reservation, especially during weekends. The BMI concerns the integration of social media in the reservation process. The objective is to develop a reservation system that is able to handle reservations in real time via multiple channels including Facebook and Twitter, and to connect the reservation system to the in-restaurant point-of-sales and table management system. For instance, Twitter can be used to give updates on table availability, to invite people to make reservations, and to respond to possible
service-related problems. Making use of data collected through these media, the reservation system can be optimized to reduce mismatch between reservations and table availability. From a BMI perspective, it can be concluded that promoting a value proposition without branding via Facebook and Twitter is in itself not good enough to achieve impact. This Spanish hamburger restaurant is exploring possibilities to combine their social media presence with their in-house restaurant systems. This example illustrates how social media can be used. The case organization is open to innovative activities but not actively reconsidering their BM. Their core business remains the same, and social media only optimize one of their activities.

2. The focus of this Spanish company is on social media marketing. Initially, the female entrepreneur started as a freelancer but later on decided to offer social media marketing services. The company changed their business model from a consultancy agency to a full-service social marketing provider. They offer online marketing consultancy, social media management, and content creation services. During the economic crisis in Spain, the company survived mainly due to its expertise in social media marketing. The BM components affected by the innovation were related to the change in value proposition, customer relations, and key resources. Communication with clients is intensive and driven by a proactive attitude. Due to their direct communication with clients, they gain knowledge about and from their customers, which is a valuable resource also for other projects. In the back-end, technical integration of the products and services offered is crucial. Communication and discussion on BMI was a continuous process within this small start-up company. Since its BMI, although operating in a very turbulent market with high competition, the company has grown in terms of business turnover, brand awareness, and client numbers. It is clear from the case that the value proposition change—as BMI—was based on social media, but this did not affect the BM fundamentally. The change from an advertisement content creator to a full-service provider was realized mainly based on market demand and on acquiring knowledge on social media marketing.

3. This case relates to a consultancy and digital marketing solution provider operating in the British market. The company’s main activities entail providing consultancy to boost clients’ online visibility and training clients on digital marketing issues. The company is highly dependent on Google Analytics. Changes in algorithms have a huge impact on the operations and business model of the company. Due to changes in Google Analytics’ algorithms, they had to adjust some components of their business model. Big data and big data analytics could offer opportunities for this company. This change required new resources such as technological infrastructure and the company’s knowledge base. The (re)use of data and the use of data from third-party providers is paramount for them. Thus, new business units were needed and established, which created a new demand and, consequently, a change in value proposition. These changes have been reflected, for instance, in the company offering training in the big data analytics (BDA) field. BMI was led by core managers, that is, the CEO and the Director of Strategy. Radical changes were made in (a) resources and team management, (b) service offerings, (c) promotion activities, and (d) partner network. In the end, these radical changes had only a minor disruptive impact on performance.

4. The core technology of this Finnish business analytics provider for traditional brick-and-mortar stores was initially focussed on collecting in-store behavioural data and providing analytics to help small retailers personalize the customer experience. The technology used is in-store localization technology based on sensors and Wi-Fi. This makes it possible to follow customers as they roam
The technology can run on existing infrastructure available within stores. The company started offering customized solutions to small retail stores, which led to impressive growth rates. However, the company developed an application to improve in-store design using augmented reality offered through a large technology provider, which led to increased sales. The company is currently being expanded to use their technology and analytics in optimization of passenger flows in airports. Thus, the technology is being reused in a different setting leading to a new customer segment and a new value proposition no longer supporting sales, but optimizing passenger flows. The expansion led to partnering with a large traditional services provider as well as a technology provider. This case illustrates that changes in business models benefit companies and change their position in different ecosystems. Also, the company of this big data and BDA case became a niche resource provider to others, which shows that the emergence of data-driven business models enables improvement of sales (channels) and optimizing of key activities.

5.6. Cross-Case Comparison

The four cases are mapped onto the conceptual model and confirmed earlier findings. It is clear from this mapping that the potential of new technologies and the focus on innovation play an important role in BM innovation experimentation and practices. Strategic considerations are mainly relevant to the big data cases, more or less suggesting that the impact of big data is based on companies’ strategic value. The social media cases suggest that both in the user as well as in the provider case, social media played only a minor role. For the user case, it was about collecting or disseminating information. While for the provider, know-how on social media was a key asset. It is also striking that the impact of big data and big data analytics on companies’ innovativeness and performance is also clearer in the big data cases than in the social media ones. Social media cases showed growth, and the impact as compared to that grounded on in-depth technology know-how is less fundamental and mainly relates to how to apply or implement social media. BM experimentation clearly takes place in three out of the four cases, however, strategy implementation of the new BM, which is core to BM practices, is not explicitly mentioned or discussed in all four cases. The cases confirm the validity of the research model partially.

6. Discussion

Findings from both the quantitative study as well as the case studies illustrate 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 BMI. The case studies show some nuances by suggesting that the impact of big data is more extensive than that of social media. This can be explained by observing that social media usage relates more to channels, while big data can affect companies in all their core activities and in the activities of their key partners. Making resources and management structure available for BMI, labelled as BM experimentation, is seen as important. As illustrated by both the quantitative data and case studies, this is a condition for the practice of implementing companies’ strategy in their BMs. It was found that BMI and strategy implementation practices in BM led to more innovations and increased performance.

The current study only gives a general picture of the relations between BMI drivers, behaviour, and outcomes. The case studies offer more detail; however, it is clear that more in-depth understanding of BMI is necessary. Specifically, the order in which BM components are changed is an important
issue to study. Understanding BMI paths as well as roadmaps to implement it is important for SMEs. BMI paths need to be developed not only for topics such as market expansion, internationalization, and starting companies, but also for how BMI works with certain technologies, that is, how BMI works when certain technologies are implemented. From the cases, it can be argued that technology characteristics play a crucial role in the incremental or radical nature of BMI. The social media cases yielded different results than the big data cases. With regard to big data and BDA, it is immediately clear—and discussed by the case companies—that BM experimentation has an impact on innovativeness and performance; this is not as evident for the social media cases. A possible explanation is that big data is far more specialized and requires in-depth mathematical as well as computational know-how, as well as know-how on analytics software and accompanying capabilities. Know-how in the case of social media is more related to the communication and marketing domains, and therefore easier to acquire. This would also imply that the conceptual model (Figure 1) needs to be tested not for specific technologies individually.

Literature on BMI and new digital technologies such as social media and big data for nontelecommunication or non-IT companies is rather scant, and literature on BM in the telecom and IT domain is mainly focussed on large companies and high-tech start-ups; thus, the way technologies drive or impact BMs of traditional SMEs is largely open for new avenues of research. In the context of understanding businesses’ digitalization, research on the impact of new technologies on traditional as well as emerging industry sectors such as digital marketing, is highly relevant. Our research contributes to both fields. It is important to stress that big data might have a huge impact on companies’ BMI and performance. Exploring big-data-driven business models might be a very important research domain.

From a regulatory or policy perspective, it is important to emphasise that innovation programs for SMEs should not only be focussed on traditional R&D and innovation approaches, but also on BM and BMI to reap the benefits of technological and product innovations. European stimulation programs, such as SME instruments in the H2020 work program, as well as national programs should pay more detailed attention to BMI and experimentation. In the current version of the SME instrument, BMI is mentioned among 12 other topics with a main focus on hard-core technology innovation. It needs to be stressed that for all these projects, attention to BM needs to be an integral part of project proposals, not only as a scapegoat, but as a serious contribution to a project. Including analyses of digital transformation’s impacts on BM is important because some forms of digital transformation—for instance, block chain or Industry 4.0—will fundamentally affect SMEs’ BMs, specifically when they operate in a networked environment.

7. Conclusions, Limitations, and Future Work

Our research contributes to a better understanding of internal and external aspects of business model innovations and to the literature on the impact of BMI on performance and outcomes, specifically when social media and big data are implied. It is important to understand how BMI is taking place in organizations and how strategies are implemented in the business logic. As research shows, both quantitative as well as qualitative research on BMI matter. This paper contributes to a better understanding of how digitalization in BMI works. It offers insights into drivers and outcomes specifically for BMI driven by digitalization. However, the authors of this paper are aware that this study has only dealt with a small part of a vast area of research. In the future, the aim is to focus in more detail on how companies experiment, how BM components are affected, and how
implementation approaches with regard to human and organizational factors affect BMI performance.

Of course, this research has some limitations, which are related to both, the quantitative as well as the qualitative studies, and to the fact that SMEs are drivers in their field of operations. Moreover, this research was conducted in Europe, with many different languages, cultural, and economic differences despite the common market. The case study research illustrates this diversity. Differences between the cases can be attributed to many factors other than differences in technology or in IT provision or usage. Case studies with a focus on SMEs are hindered by the lack of alternative data sources, which makes them highly dependent on information provided by the owner, manager, or core spokesperson, with little opportunity to access other, alternative interviewees.

There are also some limitations with regard to our research design. This paper specifically focuses on companies that are knowingly of subconscious engaged in BMI. Research comparing companies involved in BMI and companies not engaged in BMI might provide deeper insights. In addition, measurements used in this paper were based on subjective judgments; connecting these subjective judgments with real performance data would have been interesting, but this was not possible due to European regulations in relation to research ethics and informed consent. In future research, our focus will be on collecting another wave of data in order to establish causalities more clearly, as well as expanding our insights into how BMI actually takes place. This research will entail both quantitative analyses as well as extending the case studies.

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