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Business model innovation and firm performance: Exploring causal mechanisms in SMEs

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ABSTRACT

Although research has shown that business model innovation (BMI) can create a firm's competitive advantage and enhance its performance, many small and medium-sized enterprises (SMEs) fail to obtain the expected outcomes when innovating their business model. Business Model Innovation (BMI) leads to irreversible fundamental changes in key components of a company's business model, which means it carries with it a high level of risk, ambiguity and uncertainty. Drawing on the data from a cross-industry sample of 563 European SMEs, we apply structural equation modelling to examine how a firm's performance is affected by innovating its business model. A conceptual model is developed to examine how organisational capabilities and implementation of a profit- or growth-oriented strategy, as materialised in BMI, affect a firm's overall performance. The results indicate that, while the direct link between BMI and firm performance is not significant, this path is fully mediated through efficiency growth, organisational capabilities and revenue growth. Furthermore, there are significant direct effects from efficiency growth, organisational capabilities and revenue growth on firm performance. These findings confirm the validity of the model and contribute to existing literature on BMI efforts in SMEs and provide guidelines to help company owners/managers implement informed decisions about the implementation of BMI based on their firm's strategies.

1. Introduction

Almost all business owners and managers want their firm to perform well. Revolutionary advancements in technology and rapid changes in regulations and the behaviour of customers and competitors alike create serious challenges for companies wanting to do business. To sustain continued growth, become more profitable and survive, firms need to adapt their business logic (Vukanović, 2016). Businesses can either innovate their products, processes and marketing strategies, or they can innovate their business model. Since the advent of the Internet, the notions of business model (BM) and business model innovation (BMI) have received considerable attention in industry and academia (Aspara et al., 2010; Foss and Saebi, 2017). BM describes the logic of how a company creates, delivers and captures values (Teece, 2010), while BMI refers to the changes in the key elements of a firm's BM or the architecture linking these elements in a structured, novel and nontrivial way (Foss and Saebi, 2017). As a method of innovating and adapting to a changing market (Hartmann et al., 2013), a well-designed BM is able to

create and deliver value propositions that are attractive to customers. It helps create revenue streams and competitive advantages, and enables substantial value capturing by the business delivering an innovative and different portfolio of products and services (Teece, 2010).

Since all firms want to improve their performance, the contribution of BMI to firm performance has attracted much attention (Hartmann et al., 2013; Karimi and Walter, 2016; Lambert and Davidson, 2013). Some classic examples of innovative BMs and their association with the firm's performance and/or improved competitive advantage are Dell (in the computer industry), Wal-Mart (retailing), Uber (transport) and Southwest (airline industry), which all developed a novel BM by either introducing or reorganising the key components of the existing BMs in their respective industries.

On the other hand, many BMI's, for instance, IKEA's Boklok proposition for prefabricated houses and TenneT's security of electricity supply BM, failed to deliver an improved performance. Christensen et al. (2016) revealed that more than 60% of BMI-related efforts in their sample companies did not have the expected outcome, which means

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that, if not handled properly, even a well-formulated BM may not have the desired effect (Chesbrough, 2010; Knab and Rohrbeck, 2014). BMI can be seen as a double-edged sword, in that it can have very positive and negative consequences, and firms can experience substantial growth or go bankrupt, depending on whether or not the BM is implemented correctly. Hence, knowing how and when to innovate a BM is a serious challenge for firm managers/owners (Hartmann et al., 2013).

Based on these arguments, it can be concluded that BMI does not automatically trigger an impressive performance. A plausible approach may be to analyse mediating and moderating factors that allow firms to translate BMI into higher performance (Guo et al., 2017). BMI scholars have recently called for the causal analyses of the antecedences and effects of BM, for example, by using large-scale samples and applying advanced and sophisticated methodologies (Clauss, 2016; Methlie and Pedersen, 2008; Zott et al., 2011). BM researchers seem to agree on frameworks that can help managers identify relevant factors for a better understanding of their firm's BM, but that do not inform them of causal relationships that may improve their decisions (Methlie and Pedersen, 2008). As a result, informed managerial guidelines for improving BM performance are largely lacking.

In this paper, we look at how firms, in particular SMEs, exploit or modify their BMs to improve their overall performance, with the aim of developing and examining a conceptual framework that illustrates the complex mechanisms through which strategic BMI decisions influence a firm's overall performance. Although the vast majority (almost 99%) of firms worldwide are SMEs (Robu, 2013), and they provide 60–70% of the jobs in OECD countries (OECD, 2018), most studies that combine strategic and innovation management with BMs focus mainly on large firms (Hartmann et al., 2013). To remedy that state of affairs, the focus of this study is on SMEs.

We contribute to existing BM literature in two ways. First, by considering efficiency growth, revenue growth and organisational capabilities as mediating factors, the proposed research model provides a conceptual foundation for the development of avenues for practice and future research. Second, by focusing on SMEs, we contribute to the body of knowledge involving BMI in relation to firm performance. Although innovation is the cornerstone of our conceptual model, which hypothetically affects firm performance, our results theoretically contribute to BMI research by highlighting the significance of the organisational capabilities as a mediator when planning to introduce innovations to enhance firm performance. In other papers (Bouwman et al., 2018a, 2019; López-Nicolas et al., 2020) we extensively explored the role of external drivers for BMI.

The remainder of this paper is organised as follows. First, a literature review regarding the relationship between business model innovation and firm performance is presented, after which we discuss the development of the research hypotheses and describe the research model. Next, we present the data analysis and report the results of the measurement model and the conceptual model, followed by a discussion of our findings. We conclude by showing that, while revenue- and efficiency-oriented BMs are important contributors to a firm's overall performance, developing organisational capabilities may provide greater benefits. The paper concludes with a discussion of the limitations of this study and suggestions for future research.

2. Literature review

Innovating the firms' core BM in a continuously evolving environment is often driven by a desire to sustain, grow and/or become more profitable (Heikkilä et al., 2018). Although many companies have benefited from BMI, others have performed extremely poorly (Neely, 2008), failed to meet their objectives (Halecker et al., 2014) or even went bankrupt (Garfield, 2011). Restructuring key components of the BM can have negative consequences for stakeholders (MacBryde et al., 2015), for instance by eliminating existing suppliers, requiring employees to acquire new skill sets, and ultimately driving away customers.

As such, compared to product, service or process innovation, BMI carries with bigger risks and greater ambiguity. Understanding the way BMI affects a firm's performance would help business owners be more effective. We started from the systematic literature review definition of Petticrew and Roberts's (2008, p. 9–10).

We did not restrict the date of publication or the kinds of papers we reviewed, which meant that journal articles, conference papers, working papers and book chapters were included (Webster and Watson, 2002). Several online databases, such as Web of Science, ABI/INFORMS, Science Direct, and Wiley Online Library have been searched using keywords 'business model (innovation)' 'mediating,' 'moderating,' and 'performance'. This yielded 115 publications at the time we conducted the research and were considered to be relevant based on the titles, abstract and keywords. Omitting duplications, these produced 97 unique articles. In the next step, based on the reading of the abstracts, articles were screened for their fit and correspondence with our research objective. We included articles based on the following criteria:

- Articles should include hypotheses concerning the relation between BMI and business performance and these hypotheses are tested explicitly and empirically using a quantitative, empirical, analytical approach.
- Reference is made to BMI as a way of changing main components of the BM by introducing a new system of creating, delivering and capturing value.

Based on the inclusion criteria mentioned above, we identified 35 articles as irrelevant and thus were excluded from our dataset. Only articles reporting relevant outcomes (52 publications) were reviewed to determine whether or not they met our criteria. Through an in-depth review, we identified 27 articles as relevant. Furthermore, we identified references in the articles, which were used as a secondary source for literature analysis, which resulted in 10 additional articles, which we could include in our sample. As a result, our systematic literature review was built on 37 articles.

Fig. 1 shows that the topic has received attention in recent years, with approximately 76% of our 37 selected articles being published between 2012 and 2017. Moreover, 33 of the articles appeared in journals, three were conference papers and one was a working paper.

To describe, classify and analyse the articles, we used a coding approach classifying mediator, moderator and control variables. All key constructs were listed on a coding sheet (Dey, 1993) and classified into new overarching categories (Burnard, 1991). To limit the number of categories, data were grouped (Dey, 1993).

Based on these steps, twelve distinct mediating factors were identified. To classify these factors, we use the definition of BM introduced by Teece (2010) as the articulation of the logic by which a business creates and delivers value to customers, as well as capturing value by focusing on price (strategies), revenues and costs that will allow the business to

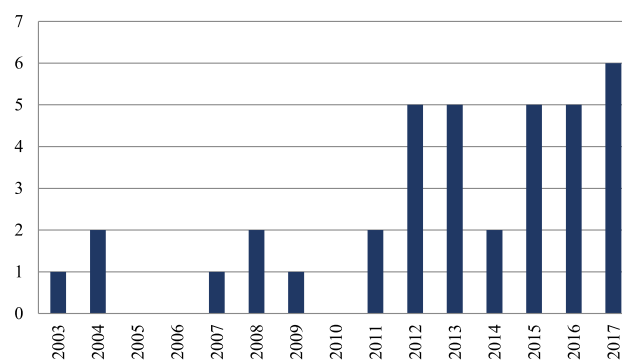


Fig. 1. Number of selected papers in our literature review (Yearly).

earn a profit. As such, we posit that BM may improve overall performance by reducing costs (efficiency and profitability) or increasing sales (market and revenue growth). Using the concepts of efficiency growth and revenue growth, we were able to identify a clear trend in the mediating variables we identified. To boost the overall performance of firms, some mediating factors were mostly related to generating revenue. These mediators increase the firm’s sales through exploring new markets, customers and value propositions, or developing service bundling, which is why we identified them as *revenue growth*. Some firms focus primarily on efficiency such as minimising the cost, increasing productivity and reducing time to market, which is why we call this *efficiency growth*. These two emphases were also identified explicitly in an extensive multiple-case study research on SMEs involved in BMI (Heikkilä et al., 2018).

Additionally, we identified some other types of mediators (e.g. organisational learning and opportunity recognition) that we were unable to relate to revenue growth or efficiency growth, because they enable companies to increase both their revenue and efficiency. We named this group as *organisational capabilities*. Such organisational capabilities are vital to the long-term performance of a business, since a culture of entrepreneurship, openness and knowledge-sharing creates a high level of cooperation within the firm as well as its associated network. This is distinct from organizational cultures where conservation of the status quo often leads to organizational inertia and, as such, is an impediment to organizational change (Audzeyeva and Hudson, 2016). Fig. 2 shows the outcome model explaining how BMI impacts a firm’s overall performance through mediating effect of efficiency growth, revenue growth and organisational capabilities.

The first two of these mediating groups (efficiency growth and revenue growth) are related but not identical to the design of efficiency- and novelty-oriented BMs as highlighted in BMI literature (e.g. Brettel et al., 2012; Hu, 2014; Gronum et al., 2016; Wei et al., 2017; Zott and Amit, 2003, 2007, 2008). The novelty-oriented BM introduced by Zott and Amit (2007) focuses mostly on the new value proposition, new links and partnerships. However, we included attracting new customers and entering new markets in the “revenue growth” mediating group, since they are a firm’s main sources of generating revenue. Moreover, efficiency-oriented BM, as introduced by Zott and Amit (2007), to a large extent is aimed at facilitating high-efficiency transactions. However, in the “efficiency growth” mediating group, we included all novel ways of reducing costs and improving productivity in a firm’s value chain, from design, production, inventory, marketing and sales to the

delivery process.

In the last decade, researchers have largely focused on efficiency- and novelty-oriented design BMs concerning performance. However, transaction cost approaches are subjective and incomplete, and they can minimise or ignore the role of learning, resource accumulation and long-term asset orchestration (Leih et al., 2015). The third mediating group (organisational capabilities) includes innovativeness, opportunity recognition, organisational learning and culture, which contribute to a firm’s readiness to change, and in particular to its ability to survive in the longer term, rather than merely achieving short-term growth. Both owners/managers and employees must be skillful at and trained in searching for, learning about and undertaking the interpretive activities needed to recognise new technological and market opportunities (Foss and Saebi, 2015).

Different BMs may need different organisational resources and capabilities. Ordinary capabilities enable firms to produce and sell their value propositions such as routines for new product development, quality control, knowledge transfer and performance measurement, in an efficient manner (Eisenhardt and Martin, 2000). However, they need something more if they are willing to explore and exploit opportunities and adapt business processes and models to the new business environment (Foss and Saebi, 2015). This is related to the concept raised by Teece (2007), who defined dynamic organisational capabilities as “the firm’s ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments” (Teece et al., 1997). Dynamic capabilities, which can be unique to each company, are shaped by a firm’s particular history, values and routines (Teece, 2012), which makes it difficult for competitors to imitate the firm’s BM.

Teece (2007) divided a firm’s dynamic capabilities into three clusters of processes and tasks: sensing, seizing and transforming. These three clusters can be easily mapped with our organisational capabilities mediator group: (1) ‘sensing’, defined as “identification and assessment of opportunities”, which can be mapped to opportunity recognition and innovativeness in our mediator group; (2) ‘seizing’, defined as “the mobilisation of resources internally and externally to address opportunities and to capture value from doing”, which can be mapped to the entrepreneurial orientation; and (3) ‘transforming’, defined as the “continued renewal of the organisation”, which can be matched here with the organisational learning and organisational culture. The organisational culture, which defines the core beliefs and in which values play a central role (Philip and Mckeown, 2004), can either encourage change and entrepreneurship or can lead to organisational inertia and have a



Fig. 2. BMI mechanism to influence a firm’s overall performance (adapted from Latifi and Bouwman, 2018).

negative impact on the organisation's performance, which is why we argue that BMI is often closely related to the transformation of an organisation aimed at making sure that the expected performance is realised. Consequently, a fundamental change in the organisational culture is a pre-requisite of a successful organisational transformation (Audzeyeva and Hudson, 2016, p. 32) and as such is closely related to BMI.

Although the concept of organisational capabilities is not new in the area of BMI, this study is among the first to examine the mediating role of organisational capabilities between BMI and a firm's overall performance. In this paper, we are interested in establishing whether organisational capabilities result in the superior performance of firms and whether engaging in BMI also improves their organisational capabilities. For instance, Kim et al. (2018) argued that innovation capability is a fundamental determinant of firm performance. Torres et al. (2018, p. 830) argued that dynamic capabilities work through their effect on the firm's ordinary, and value-generating processes, and concluded that complex mediation of the organisational dynamic capabilities can affect firm performance. In another study, Kim et al. (2011, p. 488–489) examined the direct and indirect link between the IT capabilities and firm's performance. In the model where the indirect link between IT capabilities and firm performance was examined, the organisational dynamic capabilities were incorporated as a mediator. As shown in Fig. 2, the path between business model innovation to firm performance is considered to be mediated through efficiency growth, revenue growth and organisational capabilities. In other words, the mechanism by which BMI influences a firm's overall performance could better understood via the role that these mediators play. In the following section, the research hypotheses are formulated.

3. Hypotheses development

A business model, which is used to communicate and implement strategic choices (Lambert and Davidson, 2013), is seen as a realised expression of a firm's strategy (Casadesus-Masanell and Ricart, 2010) and articulation of how available resources can be used more effectively, how costs can be managed and reduced, and how new revenue sources can be leveraged (Chesbrough, 2007). Through BMI, a firm may be able to exploit a new market that is not serviced by its competitors and open up an entire niche market (Hartmann et al., 2013). According to Bock et al. (2012), firms that want to improve their long-term performance have to innovate their BM. Moreover, the potential of technologies can often only be tapped by using a new BM (Chesbrough and Rosenbloom, 2002), which in turn could affect the development of new organisational capabilities. At a more fundamental level, scholars and practitioners agree that the BM is vital to the success of organisations, especially ones that want to grow (Teece, 2010; Terrenghi et al., 2017), gain a competitive advantage (Afuah, 2000), enhance their long-term performance (Bock et al., 2012) or act as a new source of innovation (Zott et al., 2011). However, recent studies have produced inconclusive results when testing the strength of the relationship between BMI and firms' performance in different regions and industries. Some strong correlations (>0.50) were identified (Ben Romdhane Ladib and Lakhali, 2015; Kumar et al., 2018), some moderate (0.30–0.50) (e.g., Brettel et al., 2012; Guo et al., 2017; Waldner et al., 2015) and some weak correlations (<0.30) (e.g., Gronum et al., 2016; Hartmann et al., 2013; Heij et al., 2014; Karimi and Walter, 2016; Wei et al., 2017). A limited number of researchers have also reported that they were unable to establish any significant relationship between BMI and firm performance under certain assumptions (Velu, 2015; Kumar et al., 2018). Therefore, to examine whether BMI impacts the performance of SMEs in the European context, we propose the following hypothesis:

H1. If a firm engages in BMI, its overall performance will improve
Heikkilä et al. (2018) emphasised that BMI influence on firm performance occurs when there is a focus on efficiency. Their findings

confirmed the earlier research results of Zott and Amit (2007), who indicated that the efficiency-oriented BM design has an impact on a firm's overall performance. BMI can help ICT ventures complete their transactions efficiently, for example by reducing transaction costs within the firm and with its outsiders (Ben Romdhane Ladib and Lakhali, 2015). According to Chesbrough (2007), BMI leverages performance not only by reducing production costs but also by utilising available resources more effectively. For instance, by adopting new partnering models, such as outsourcing, organisations are able to scale operations more effectively. Fast and transparent transactions enable participants to make informed decisions. Gronum et al. (2016) and Wei et al. (2017) also found that BM designs that focus on efficiency enhance a firm's performance by reducing inventory costs – thus benefitting both customers and suppliers – and reducing marketing, sales and other communication expenditures. Furthermore, increasing the business scale leads to reduced operational costs (Hu, 2014). Therefore, by focusing on reducing operational cost, savings can be passed on to customers. The higher the efficiency of a firm's operations, the better, faster and cheaper services can be delivered to customers. As such, it could be concluded that BMI has an impact on a firm's efficiency, which in turn positively influences the firm's performance. Hence, we posit that efficiency growth mediates the path between BMI and firm performance. In light of this, we propose the next hypotheses:

H2a. The BMI has a direct positive effect on efficiency growth

H2b. Efficiency growth has a direct positive effect on a firm's overall performance

H2. The path between BMI and a firm's overall performance is mediated through efficiency growth

However, as suggested by Heikkilä et al. (2018), the focus can also be on attracting new customers and expanding markets. Some scholars argue that BMI, through the creation of new value propositions (Teece, 2010; Wei et al., 2017) or opportunity recognition (Guo et al., 2017), can attract new customers by exploring a market niche not addressed by competitors (Zott and Amit, 2007). That could happen through market penetration (increasing the number of customers/sales in existing markets) or market development (selling existing products or services in new markets). Moreover, BMI, by using new channels to drive economic exchanges for stakeholders, can create new value (Ben Romdhane Ladib and Lakhali, 2015). For instance, by adopting new partnering models, organisations are able to create additional access to resources to rapidly scale up when new opportunities arise (Giesen et al., 2010). Introducing a new BM with new components can also provide opportunities for new complementary effects among existing components, for instance by bundling or unbundling services and products, or by servitisation (Heij et al., 2014), and in this way, a firm can increase revenues. Gronum et al. (2016) confirmed the mediatory effect of the novelty design theme between innovation breadth and a firm's performance. As such, it can be concluded that BMI not only affects a firm's revenue growth, but that the revenue growth in turn also affects the firm's performance. As such, we inferred that revenue growth mediates the relationship between BMI and firm performance and propose the following hypotheses:

H3a. The BMI has a direct positive effect on revenue growth

H3b. Revenue growth has a direct positive effect on a firm's overall performance

H3. The path between BMI and a firm's overall performance is mediated through revenue growth

BMI research has to a large extent focused on efficiency and novelty, mostly with a reference to Zott and Amit (2007), rather than on the organisational or human side of BMI. In addition to the themes of efficiency and novelty, engaging in BMI may help a firm develop organisational capabilities, which in turn provide an innovative, opportunity-seeking environment with a risk-taking attitude, resulting in a superior organisational outcome.

Researchers have identified several important factors that can be viewed as organisational capabilities. First of all, the capacity to innovate is one of the key factors in improving business performance (Burns and Stalker, 1961; Porter, 1990). The more innovative a company is, the better it can perform in today's turbulent business environment. Second, the organisational culture – its standards, values and beliefs – can boost behaviour that is ultimately related to business performance (Hult et al., 2004). When specific attitudes are accommodated through organisational culture, the consequences are diffused across circumstances, groups and individuals inside the organisation. A culture that supports the implementation of a strategic attempt and encourages the enthusiastic participation of all employees is hard to imitate and as such can help create a sustainable competitive advantage (Anning-Dorson, 2017).

Third, in a study of 181 firms, Hult et al. (2004) found that market orientation and entrepreneurial orientation as a result of BMI positively affect innovativeness, and through that the business performance. Hult et al. (2004) concluded that innovativeness appeared to be a key mediator in their empirical research. This can be done within a firm in various ways, such as by sharing the business idea within the entire organisation, developing opportunity-seeking capabilities and creating real value propositions. As a consequence, BMI can contribute to innovativeness (Bouwman et al., 2018a). Fourth, the ability to seek opportunities might mediate the relationship between BMI and performance. The role of BMI in opportunity-seeking behaviour has been emphasised in several studies (Chesbrough, 2010; Dewald and Bowen, 2010). While the logic of firms to create, deliver and capture value is communicated through the entire organisation and its networks, stakeholders consciously seek new opportunities for the firm. Mahmood and Hanafi (2013) have shown that entrepreneurial orientation is a resource and capability that provides a competitive advantage and gives a firm's performance an impressive boost. Several studies investigated the direct effects of corporate entrepreneurship on a firm's performance (George and Bock, 2011; Karimi and Walter, 2016; Miller, 2011).

And finally, organisational learning is one of the critical organisational processes through which information and knowledge can be processed, and it can change the attributes, behaviours, capabilities and performance of an organisation (Cohen and Levinthal, 1990), which is why we propose including organisational capability as an alternative mediating factor between BMI and firm performance. Moreover, given that SMEs display unique internal capabilities due to their smaller size, specialised knowledge in certain industry, market and geographic reach (Bianchi et al., 2010), by innovating their BM, they can adapt to changing environments and maintain internal flexibility and efficient operational processes (Heider et al., 2020). As such, it can be concluded that BMI not only affects organisational capabilities, but that the organisational internal capabilities can play a positive role in enhancing the performance of a firm as well. As such, we inferred that revenue growth mediates the relationship between BMI and firm performance. Hence, we propose the following hypotheses:

H4a. The BMI has a positive effect on organisational capabilities

H4b. Organisational capabilities have a direct positive effect on a firm's overall performance

H4. The path between BMI and a firm's overall performance is mediated through organisational capabilities

Organisational capabilities like innovativeness, opportunity recognition, organisational learning and culture can help owners, managers and employees excel at the scanning, learning and creating activities needed to identify new technological and market opportunities (Foss and Saebi, 2015). Firm can orchestrate resources more effectively and use them more efficiently through organisational capabilities like opportunity recognition and organisational learning (Leih et al., 2015), which in turn allow the firm to explore and take advantage of opportunities, and synchronize business processes and models (Teece et al., 1997). These capabilities provide the flexibility to make the required

modification and alignment within and outside of the firms' ecosystem. Indeed, the high level of internal cooperation requires support from a culture of openness and knowledge-sharing. According to Leih et al. (2015), learning capability can improve firms' capability to identify and deal with market challenges better, faster, and at lower costs than rivals, as well as to improve firms' ability to develop new propositions for customers in new or existing markets.

Based on these premises, we acknowledge that the organisational capabilities can not only mediate the relation between BMI and firm overall performance, as proposed by the research hypothesis H4, but may also have a positive effect on a firm's efficiency and revenue growth. Since the relationship between organisational capabilities and BM design has rarely been studied (Pucci et al., 2017) and in most cases has been discussed in qualitative and case-based investigations (Casadesu-Masanell and Ricart, 2010), we want to conduct a quantitative examination of the relationship between organisational capabilities and the firm's efficiency and revenue growth (see Fig. 3), which leads us to our final group of hypotheses:

H5. If a firm engages in BMI, its organisational capabilities positively affect efficiency growth

H6. If a firm engages in BMI, its organisational capabilities positively affect revenue growth

4. Research method

4.1. Developing the measurement model

To ensure the reliability of the measurement and assemble a comprehensive list of measures, we reviewed the literature in relevant domains, such as entrepreneurship, strategic management, innovation management, information systems and BMs. Financial performance lies at the heart of firm performance. Accounting metrics, such as return on equity (ROE), return on assets (ROA) and return on sales (ROS) measure financial performance (Parker, 2000) and show a firm's existing level of profitability. Although financial performance measures are crucial, they are not enough to define a firm's overall performance (Murphy et al., 1996). Business performance, which determines market-related items like growth, market share, diversification and product development (Gray, 1997), includes both existing business measures (sales growth and market share) and the firm's future positioning (new product development and diversification).

In this research, overall firm performance was measured subjectively, using the model proposed by Venkatraman and Ramanujam (1986). It has been argued numerous times that the use of subjective performance measures is a valid proxy for objective performance measures (Dess and Robinson, 1984; Mc Dermott and Prajogo, 2012; Venkatraman and Ramanujam, 1986). Dawes (1999) stated that although using an objective measurement of a firm's overall performance has some advantages, firms may be reluctant to disclose their actual performance data. The practical issues also involved collecting objective measures within a large-scale survey (computer-assisted telephone interview). In this research, the firm's overall performance (PER) in the last 24 months was measured on eight items, specifically five financial performance measures (sales growth, profit growth, return on investment, net income, and market value) and three market performance measures (speed to market, market share, and penetration rate). All items were measured using a 7-point Likert scale (Venkatraman and Ramanujam, 1986).

Well-known innovation surveys, like European Community Innovation Survey (CIS), the Japanese National Innovation, or the US Business R&D and Innovation Survey (BRDIS), as yet do not have any item to measure the BMI concept (Barjak et al., 2014). Based on the theoretical discussion on BMI, we argue that business model innovation is, in fact, a multidimensional construct, or a second-order reflective-formative construct. The use of second-order constructs is increasingly common in

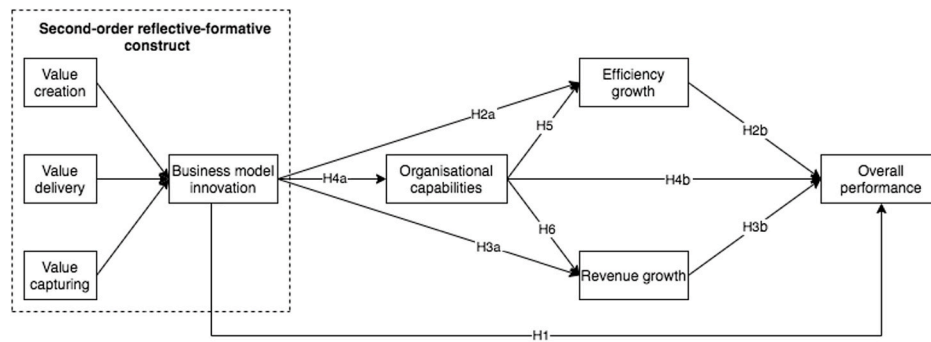


Fig. 3. Research conceptual model on how BMI influences a firm's overall performance.

PLS-SEM studies, because they allow us to make the path model more parsimonious and increase the content comprised by specific constructs (Duarte and Amaro, 2018; Hair et al., 2017). As all multidimensional constructs, such as BMI in this research, contain different facets, such as value creation, value capturing and value delivery (Lee and Cadogan, 2013), we further justify our methodological choice to consider BMI as a reflective-formative multidimensional construct. Moreover, first-order factors like value creation, value delivery and value capturing are expected to have a high level of correlation with each other while capturing different dimensions of business model innovation.

Hence, BMI was measured with seven items, which each referred to one of the three dimensions of BM, defined by Barjak et al. (2014). Firstly, *value creation*, in which participants were asked to indicate if they had introduced new products or new services (Giesen et al., 2007; Mitchell and Coles, 2003). Secondly, *value delivery* was measured by focusing on a new market segment (Itami and Nishino, 2010, p. 364), shared new responsibilities with business partners, starting to

collaborate with new business partners (Barjak et al., 2014). Thirdly, *value capturing* was measured by introducing a new pricing mechanism and creating a new revenue stream (Johnson et al., 2008).

With regard to the mediating constructs, efficiency growth (EG) was measured by four items, asking respondents to reflect on issues like (i) cost reduction, which was measured by “introducing new ways to reduce fixed costs” and “new ways to reduce variable costs” from Lindgardt et al. (2009), and (ii) productivity improvement, which was measured by two items from Ross et al. (2006), namely the business process standardisation and business process integration. We measured revenue growth (RG), as the second mediating construct, by five items, (i) creating new markets, (ii) new ways to transact with customers, (iii) novel relations mechanism with clients, (iv) new ways of advertising products or services, and (v) scale up the business and focus on product offering, from Chesbrough and Rosenbloom (2002), Zott and Amit (2007) and Osterwalder et al. (2005). Organisational capabilities (OC), the third mediating construct, was measured by seven items. Three items

Table 1
Descriptive statistics, convergent validity, and internal consistency and reliability of items.

Constructs	Items	Factor Loadings	t-statistics	α	CR	AVE					
Overall firm performance	The sales growth of the enterprise	0.82	48.40	0.91	0.93	0.62					
	The profit growth of the enterprise	0.83	53.41								
	Market share	0.75	26.16								
	Speed to market	0.71	26.37								
	Penetration rate	0.77	33.73								
	Market value	0.79	42.02								
	Net income	0.81	37.51								
Revenue growth	Return on Investment (ROI)	0.79	34.67	0.74	0.83	0.67					
	Advertising products and services in a new way	0.71	25.47								
	Scale-up your business	0.71	30.14								
	Focus your product offering	0.67	26.26								
	Introduced new ways to transact with customers	0.70	30.14								
	Introduced new ways of organising relations with customers	0.72	18.40								
	Advertising products and services in a new way	0.71	25.47								
Efficiency growth	Introduced new ways to reduce variable costs	0.66	13.71	0.71	0.82	0.53					
	Introduced new ways to reduce fixed costs	0.69	14.85								
	Business processes standardisation	0.82	29.99								
	Business processes integration	0.83	34.42								
	Managers encourage employees to think outside the box	0.68	21.41								
Organisational capabilities	Our corporate culture is focused on constant innovation	0.79	33.96	0.87	0.90	0.53					
	Our enterprise shows perseverance in turning ideas into reality	0.74	28.08								
	Our enterprise ability to identify new opportunities	0.75	34.13								
	Our enterprise aims to create multiple innovations annually	0.78	37.25								
	Our enterprise introduces innovations that are completely new to the market	0.74	36.67								
	Creating more than one innovation at the same time is common practice in our enterprise	0.73	31.11								
	Business model innovation	Value capturing	Introduced new products as a new value proposition				0.82	16.52	0.73	0.81	0.51
			Introduced new services as a new value proposition				0.86	21.80			
Value delivery		Started to collaborate with new business partners	0.76	15.80							
		Shared new responsibilities with business partners	0.71	13.37							
Value creation		Focused on a completely new market segment	0.71	26.61							
		Created new revenue streams	0.86	12.43							
		Introduced a new pricing mechanism	0.72	21.42							

Note: CR = Composite reliability; AVE = Average variance extracted.

were used to measure firm innovativeness, namely (i) introducing innovations that are completely new to the market, (ii) creating multiple innovations annually, and (iii) creating more than one innovation at the same time is common practice in our enterprise (Subramanian, 1996). Two items were used to measure firm culture, (i) focusing on constant innovation and (ii) managers encouraging employees to think outside the box (Hult et al., 2004). Also, entrepreneurial orientation was measured using two items, (i) the ability of the enterprise to identify new opportunities, and (ii) perseverance in turning ideas into reality (Atuahene-Gima, 2005). Table 1 lists the items that were used to measure the research constructs.

4.2. Survey administration, sample and data collection

The population in this study consists of European SMEs in any industry that have engaged in business model innovation in the previous 24 months. The sample was based on Dun and Bradstreet’s database. The firms were randomly selected from the database, with two restrictions: first, the countries included in the research has to be spread all over Europe and at least one large and small country would be included for each region (North, East, Central, South and West), and second, certain quotas regarding micro-enterprises, small and medium-sized enterprises (36%, 32%, and 31%) were applied. No quotas were defined in terms of industry sectors. A telephone questionnaire was used to collect data by a professional research agency that uses native speakers and computer-aided telephone interviewing. The initial response rate was about 26%, however, since our population involved SMEs actually engaged in BMI, the questionnaire starts with a generic question, and five specific selection questions, asking whether the company in question changed its BM in the previous 24 months. These questions were included to ensure that the firms actually were involved in BMI (Langerak et al., 2004). The respondent was included in the sample if the answer to at least one selection question was positive. The original questionnaire was developed in English, then translated into Dutch, French, Finnish, German, Italian, Lithuanian, Polish, Portuguese, Slovenian, Spanish and Swedish, and then translated back to ensure that translation did not introduce any bias in the measures. The questionnaire was based on existing and validated scales (see above), and it had been pretested in the 13 countries involved in this research project, iterated and pretested, and read aloud to managers and academics to improve the clarity of the questions and to prevent any potential ambiguous expressions.

Key respondents (owners or BMI managers) were interviewed, and personal identification data were deleted by the research agency to ensure confidentiality and anonymity. The key respondents had to demonstrate that they were knowledgeable about their firm’s BMI practices (Atuahene-Gima, 2005). Data were collected in 2017 and, of the 1686 respondents, 37% answered positively to at least one of the selection questions and were therefore included in the sample. The final dataset contains 563 SMEs in 17 different industries in 13 European countries engaged in BMI.

5. Data analysis

We apply PLS-SEM, using Smart PLS v.3 to test the research model shown in Fig. 3.

5.1. Validity and reliability

To assess the data’s internal validity, factor loading was examined, which is basically the correlation coefficient for the variable and factor (Awang, 2012). The factor loading for an item is recommended to be at least 0.60 (Hair et al., 2010, 2011). As shown in Table 1, all items have a higher value than the recommended threshold. In other words, all the item-to-construct loadings were statistically significant, thus confirming their uni-dimensionality. Moreover, Cronbach’s alpha is a common test for internal reliability of the latent constructs (Bryman and Bell, 2011),

and the threshold value is said to be 0.70 or higher (Hair et al., 2011).

All constructs satisfied the recommended value, the highest value was 0.91 for the firm’s overall performance, and the lowest was 0.73 for BMI. As Cronbach’s alpha tends to undermine internal consistency reliability, Hair et al. (2014) recommended CR estimate and suggested 0.70 or higher as a rule of thumb value. Composite reliability provides a better assessment of internal consistency and reliability of the latent constructs. The results showed that the lowest value of CR was for BMI (0.81) and the highest CR was for overall firm performance (0.93). Convergent validity was examined by computing average variance extracted (AVE), which measures the average amount of variance that a construct captures from its indicators relative to the amount of measurement error, the value of at least 0.50 is suggested as a threshold (Hair et al., 2011). As Table 1 shows, all constructs passed the threshold with the lowest AVE of 0.51 for the BMI, and the highest value of 0.67 for the revenue growth.

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). Table 2 shows the results of the Fornell–Larcker assessment. As can be seen, all the AVE values satisfied the requirement and showed that the constructs were adequately discriminated.

An alternative criterion for assessing discriminant validity is HTMT, or the average heterotrait–heteromethod correlations measuring the relative to the average monotrait–heteromethod correlations. Monotrait–heteromethod is the correlation of indicators measuring the same construct, and heterotrait–heteromethod is the correlation of indicators across constructs measuring different phenomena. An HTMT value close to 1 indicates a lack of discriminant validity. However, some authors, like Henseler et al. (2014, p. 129), used a more conservative threshold and suggested the value of 0.85 for HTMT, or value of 0.90 for a more liberal assumption. As shown in Table 3, the HTMT values were lower than 0.85. We therefore concluded that discriminant validity was not an issue.

We also examined the common method bias in our analysis. According to Kock (2015, p. 7), if the variance inflation factor (VIF) at the factor levels is greater than 3.3, it can be considered as an indication of pathological collinearity, and also as an indication that a model may be suffering from a common method bias. In the full collinearity test, at the factor levels, all the VIFs’ values were lower than 3.3, so the model used in this study was considered to be free of CMD.

6. Results

To test the hypotheses and path analysis, we employed the structural equation modelling (SEM) using SmartPLS v.3 software. The mediation test analyses with regard to three variables, namely efficiency growth, revenue growth, and the organisational capability were also computed. We used PLS-SEM due to threefold advantages, (i) it allows to incorporate both reflective and formative measures, (ii) it is suitable for large and complex models and (iii) it has less restrictive assumptions about

Table 2
Correlation among constructs and square root of the AVE.

Constructs	BMI	EG	OCAP	OP	RG
Business model innovation (BMI)	.615				
Efficiency growth (EG)	.486	.727			
Organisational capabilities (OC)	.518	.381	.744		
Overall performance (OP)	.405	.381	.437	.784	
Revenue growth (RG)	.607	.486	.531	.457	.701

Table 3
Heterotrait–monotrait ratio of correlations (HTMT).

Constructs	BMI	EG	OCAP	OP	RG
Business model innovation (BMI)					
Efficiency growth (EG)	.685				
Organisational capabilities (OC)	.647	.462			
Overall performance (OP)	.494	.449	.483		
Revenue growth (RG)	.821	.653	.655	.549	

the data (Hair et al., 2011).

6.1. Path model analysis

We tested several alternative models with reversed causalities. In the final model, firms’ overall performance is explained by a variance of 29% and the three mediators –efficiency growth, organisational capabilities, and revenue growth were explained by a variance of 26%, 27% and 43%, respectively, in the model. The value of SRMR, which assesses the model fit when PLS-SEM is used, was 0.078, indicating a good model fit. The SEM results showed that the direct path between BMI and the firm’s overall performance was significant (in the absence of mediators); thus, H1 is supported by the model ($\beta = 0.41, t = 11.119, p < .001$).

However, this direct path between BMI and the firm’s overall performance was not significant when the three mediators were included in the analysis. The path between BMI and efficiency growth was significant ($\beta = 0.40, t = 8.994, p < .001$); thus, H2a was supported by the model. The path between BMI and revenue growth was significant ($\beta = 0.45, t = 11.826, p < .001$); thus, H3a was also supported by the model. The results also revealed that the path between BMI and organisational capabilities was significant ($\beta = 0.52, t = 16.111, p < .001$); thus, H4a was also supported by the model. Moreover, the path between efficiency growth and the firm’s overall performance was significant ($\beta = 0.15, t = 3.284, p < .001$); thus, H2b was supported by the model. The path between revenue growth and the firm’s overall performance was significant ($\beta = 0.21, t = 3.914, p < .001$), thus H3b was supported by the model. Moreover, the path between organisational capabilities and the firm’s overall performance was significant ($\beta = 0.22, t = 4.442, p < .001$); thus, H4b was supported by the model. Finally, the results showed that organisational capability had positive effects on both efficiency growth ($\beta = 0.18, t = 3.629, p < .001$) and revenue growth ($\beta = 0.30, t = 7.073, p < .001$), thus H5 and H6 were both supported by the model (see Fig. 4).

In order to establish discriminant validity in our second-order construct and examine whether the use of second-order reflective-formative construct for BMI was indeed a better choice, we performed a chi-square difference test. We computed chi-square test between the

first- and second-order models. As shown in Table 4, differences were found at both levels, i.e., measurement model and structural level. We found that the second-order model had a better model fit and more significant paths. Moreover, as recommended by Bagozzi et al. (1991), the correlations among all the first-order factors within the second-order construct must be lower than 0.90, and in our case, all first-order constructs satisfied this criterion, which means we established an acceptable discriminant validity.

6.2. Results of mediation analysis

A significant indirect ($\beta = 0.32, t = 8.529, p < .001$) relationship between BMI and the firm’s overall performance confirmed that the independent variable (BMI) is a significant predictor of the dependent variable (firm’s overall performance). Satisfying this condition provides the ground for testing the mediation relationship between BMI and the firm’s overall performance through efficiency growth, organisational capabilities and revenue growth. Based on the SEM results, as we expected, the mediation test results showed that the path between BMI and the firm’s overall performance was fully mediated through three mediators (i.e., efficiency growth, revenue growth and organisational capabilities) in our proposed model. The effects of each individual mediator can be seen in Table 5. The strongest effect, however, was the one through organisational capabilities and the weakest through efficiency growth.

6.3. Multigroup analysis

To assess if the firm size and firm age impact the path relationships proposed in the model, we ran multigroup analysis. To do so, we focus on the definition of small and medium-sized enterprises (SMEs) provided by European Commission (2016) as classified based on the number of employees. We divided data into three groups: group 1_{micro-enterprises} have up to 10 employees (N = 201), group 2_{small enterprises} have 11–50 employees (N = 181) and group 3_{medium-sized enterprises} have between 51 and 250 employees (N = 173). The MGA results show that the size of firm has an impact on some paths, indicating a group difference. For example, the path between organisation capability to firm

Table 4
Chi-square difference between first-order model and second-order model.

	Chi-square	Degree of freedom	p-value	Indifference
First-order model	1655.98	1352		
Second-order model	1799.21	1418		
Difference	143.23	66	.001	No

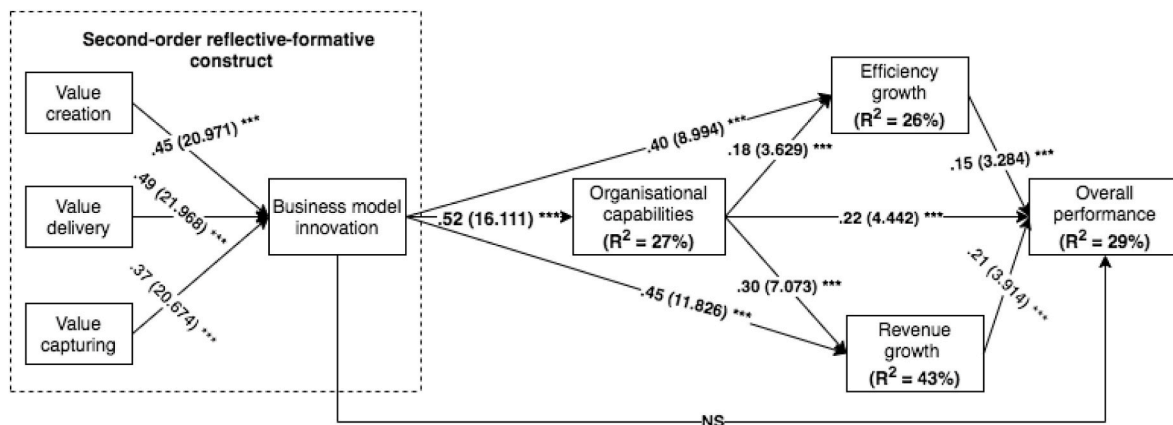


Fig. 4. Structural model results.
Significance levels: *** $p < .001$ ** $p < .005$ * $p < .01$, and NS means not significant.

Table 5
The mediation results between BMI and a firm's overall performance.

Mediation paths	β	t-Statistics	P-value	Mediation
BMI → Efficiency growth → Overall performance	.06	3.067	.002	Full mediation
BMI → Revenue growth → Overall performance	.10	3.833	.001	Full mediation
BMI → Organisational capabilities → Overall performance	.12	4.352	.001	Full mediation

performance was significant for group 2_{small enterprises} ($\beta = 0.39$, $t = 4.997$, $p < .001$) and group 3_{medium-sized enterprises} ($\beta = 0.32$, $t = 3.559$, $p < .001$), but this path was not significant for group 1_{micro-enterprises}. Moreover, the MGA results showed that the paths between efficiency growth and firm performance ($\beta = 0.19$, $t = 2.670$, $p < .01$), and organisational capability and efficiency growth ($\beta = 0.19$, $t = 2.304$, $p < .01$) were only significant for group 1_{micro-enterprises} and not significant for other two groups.

The importance of firm age has also been mentioned by prior studies classifying firms based on the number of years since the firm was established (Gronum et al., 2016; Anning-Dorson, 2017; Guo et al., 2017; Wei et al., 2017). We followed this classification approach and divided our data into two groups. Group 1_{young firms} ($N = 139$) (i.e. firms founded after 2005) and group 2_{established firms} ($N = 416$) (i.e. firms founded before 2005). The MGA results showed that the path between organisational capability and efficiency growth was only significant for group 1_{young firms} ($\beta = 0.40$, $t = 4.319$, $p < .001$). Also, the path between organisational capability and firm performance was only significant for group 2_{established firms} ($\beta = 0.24$, $t = 4.242$, $p < .001$) and not for the other two groups.

7. Discussion

7.1. Direct relationship between BMI and overall performance

Although recent studies produced inconclusive results when testing the strength of the relation between BMI and firm performance, in this study, a direct relation between BMI and the firm's overall performance (without including the mediators) was found to be significant for a sample of European SMEs. This result is consistent with the findings of Ben Romdhane Ladib and Lakhali (2015), Brettel et al. (2012), Guo et al. (2017), and Waldner et al. (2015) who also found similar results. However, when we incorporated the mediating factors (e.g., organisational capabilities), our results were consistent with earlier findings by Liu and Han (2013), Velu (2015) and Kumar et al. (2018). Velu (2015) demonstrated that there is a non-linear relationship between BMI and firm performance, and that the relationship between a firm's survival time and the degree of BMI is U-shaped.

7.2. Mediation relationships between BMI and overall performance

Unlike Pucci et al. (2017), who identified a negative effect of the operational efficiency of BM on firm performance, our results are in line with the finding of earlier studies (Ben Romdhane Ladib and Lakhali, 2015; Brettel et al., 2012; Chesbrough, 2007; Heikkilä et al., 2018), showing that efficiency growth positively mediates the relation between BMI and the firm's overall performance and, as such, predicates the mediatory effect of efficiency.

With regard to revenue growth with a focus on attracting new customers and expanding firm's markets, we followed Heikkilä et al. (2018) and conceptualised revenue growth as a mediator, which is in line with findings reported by Ben Romdhane Ladib and Lakhali (2015), Brettel et al. (2012), Gronum et al. (2016), Wei et al. (2017), and Zott and Amit (2007). Revenue growth is a stronger mediator than efficiency growth in SMEs, since revenue growth mediation effect is 0.10 compared to 0.06

for efficiency growth, which is consistent with Zott and Amit (2007).

The third mediating construct we examined is organisational capabilities. Our study is consistent with previous studies which confirmed the significant mediation effect of organisational capabilities between BMI and a firm's overall performance (e.g., Anning-Dorson, 2017; Bock et al., 2012; Hult et al., 2004; Mahmood and Hanafi, 2013). However, these studies usually focus on one specific capability, for example entrepreneurial orientation, organisational culture or and market orientation, whereas we incorporated several organisational capabilities. Introducing and examining organisational capabilities as a mediator, this study has extended prior literature on business model innovation, by showing that developing organisational capabilities are a stronger mediator than the existing mediators of revenue and efficiency growth when it comes to improving overall firm performance (mediation effect of organisational capabilities is 0.12 compared to 0.10 and 0.06 for revenue and efficiency growth, respectively). The results indicate that the owners/managers of SMEs could, in addition to looking at their businesses' efficiency or revenue growth, also pay more attention to organisational capabilities like opportunity recognition, innovativeness and active organisational learning.

We also assessed the contingency factors like firm size and firm age as control variables and results showed the impact of these two variables on the results. Larger firms benefit from economies of scale (Thompson, 1967), enjoy better relationships with and control over external stakeholders and resources (Aldrich and Pfeffer, 1976; Ordanini et al., 2004) and have superior bargaining power (Zott and Amit, 2007), while smaller organisations have the advantage when it comes to creating and capturing new opportunities and exploring new markets (Damanpour and Wischnevsky, 2006). Furthermore, some scholars believe that established firms are more experienced, enjoy the benefits of learning and increasingly focus on efficiency (e.g. through standardisation and formalisation), and therefore enjoy a superior performance (Brettel et al., 2012). However, they are unlikely to possess the flexibility needed to make a rapid change and they are likely to lose out to younger and more agile firms (Majumdar, 1997). Knowing the influence of firm size and age on the BMI efforts can provide the managers/owners of SMEs with a more comprehensive overview of the best way to engage in BMI, for instance in terms of which of the mediation factors (efficiency and revenue growth, and organisational capabilities), is more important for micro-sized firms and more mature SMEs.

8. Conclusion

In today's complex and dynamic environment, firms need to improve their performance, for instance by innovating their business model (BM). However, and in spite of the increasing number of studies on BMs, the impact of business model innovation on firm performance, in particular with regard to causality, remains largely unexplored (Ben Romdhane Ladib and Lakhali, 2015; Bock et al., 2012; Lambert and Davidson, 2013). This study presents a model that would allow researchers and practitioners to understand the mediation mechanisms through which BMI affects firm performance. Although based on cross-sectional data, the model performs better than alternative models and therefore the suggested causality could offer the most likely insights into causal mechanisms.

A conceptual research framework based on a systematic literature review of 37 empirical studies involving potential moderating and mediating factors between BMI and firm performance was developed and applied to a unique survey dataset of 563 European small and medium-sized enterprises to examine the mechanisms through which BMI influences firm performance. Our findings contribute to existing literature by theoretically and empirically validating that *efficiency growth*, *revenue growth* and *organisational capabilities* are relevant mediators for the effects BMI on a firm's overall performance. We found that the organisational capabilities not only fully mediate the relationship in a more convincing way but could also have a positive effect on the two

other mediators (efficiency growth and revenue growth). In addition, this study adds to BMI literature by suggesting that BMI is a multidimensional second-order reflective-formative construct. While the business world is constantly changing in technological terms, regulations and customer needs, we believe that these results advance BMI research by opening the black box of the relationship between BMI and a firm's overall performance and increase our understanding of the BMI phenomenon.

Future research can examine different organisational capabilities as mediators. Although there are a number of organisational capabilities, we examined only entrepreneurial orientation, innovativeness and organisational culture, realising that other capabilities, which may mediate the relationship between BMI and performance – for example, employee training and leadership style – are also worth investigating, specifically in relation to the different types of BMI, for instance component-based or architectural. Furthermore, the focus of this study was on exploring mediation factors. Including moderating factors like firm size and firm age, industry sector, level of competition or the BMI implementation skills within firms, and looking at things like employee commitment, the level of support from top management team and the use of BMI tools (Latifi and Bouwman, 2018), can present interesting avenues for further research.

8.1. Practical implication and limitations

Our results have implications for academic literature on BMI and practitioners. First, by considering mediating effects, the model shows how managers can ensure that BMI helps improve the performance of their firms. The owners/managers of SMEs need to carefully assess their specific situation, in order to take appropriate measures to improve the effect of BMI on their firm's performance and focus either on growth or on profit to fully benefit from their BMI-related efforts. Moreover, managers need to be aware of the organisational capabilities in relation to BMI. Although the focus in most BMI studies is on the managerial and the organizational side of the process of BMI, they rarely look at the way the implementation of the discrete innovated BM itself and of the organizational resources and capabilities is managed (Bouwman et al., 2020). In light of the importance of the mediating role played by organizational capabilities, it is important for managers, as well as the people advising them, to create an open, dynamic and entrepreneurial culture, to prepare, inform and engage employees and other stakeholders in discussions regarding BMI and in reviewing the existing BM. Although BMI is never a linear path, and there will be many iterations and fall-backs, developing a roadmap is quite helpful (De Reuver et al., 2013). Tooling to support BMI and the timely implementation of the discrete innovated BM in operations is increasingly available and using these tools will help managers secure a smooth and agile transition, not only in a technical sense, but also when it comes to social and organisational aspects. The use of agile and scrum-based approaches in theory and in practice (Bouwman et al., 2018b) with regard to BMI will help managers deal with rapid changing external factors and dynamics.

This study also has some limitations that should be taken into account when interpreting the findings. First of all, although cross-sectional data are used extensively in business and management research, they do represent a single point in time and make it hard to determine the cause and effect or the impact of changes over time. Although we tested models with alternative causal paths and explicitly used a time frame of 24 months in our selection questions to establish whether or not the SMEs were engaged in BMI, and some performance indications could be experienced, a more rigorous test based on longitudinal data would be an important next step (Aspara et al., 2010). However, longitudinal research does come with a number of complicating factors, for instance larger samples are required due to sample mortality, while greater attention needs to be paid to control over external, dynamic factors. A second limitation has to do with the sample size for specific subcategories, which may be somewhat skewed. In

addition, there is no sample frame that includes all SMEs engaged in BMI. In this study, we tried our best to shed some light on the population of SMEs engaged in BMI, but we expect that industry-specific research may yield more in-depth and nuanced insights. Finally, although the respondents – mainly top managers – had a high degree of relevant knowledge, all the measures were based on subjective self-assessment, including firm performance. Future research should collect objective measurements to eliminate common method bias, although, in practice, it may be difficult to gather micro-data from subjective and objective sources like statistical offices. Finally, we acknowledge that we focused mainly on items internal to the firm. However, we are aware of the fact that external forces may often reduce the efficacy of BMI initiatives. Moreover, based on numerous case studies we have conducted and published, we found that external dynamics can also play a disruptive role in BMI. However, in this paper, we want to quantitatively confirm some of our qualitative findings and focus on the mediating role of organisational capabilities (including the need for a positive, innovation and entrepreneurial culture) to achieve BMI and to see how that affects firm performance.

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References

- Afuah, A., Tucci, C., 2000. *Internet Business Models and Strategies: Text and Cases*. McGraw-Hill, New York.
- Aldrich, H.E., Pfeffer, J., 1976. Environments of organizations. *Annu. Rev. Sociol.* 2 (1), 79–105.
- Anning-Dorson, T., 2017. Moderation-mediation effect of market demand and organisation culture on innovation and performance relationship. *Market. Intell. Plann.* 35, 222–242. <https://doi.org/10.1108/MIP-04-2016-0066>.
- Aspara, J., Hietanen, J., Tikkanen, H., 2010. Business model innovation vs replication: financial performance implications of strategic emphases. *J. Strat. Market.* 18 (1), 39–56. <https://doi.org/10.1080/09652540903511290>.
- Atuahene-Gima, K., 2005. Resolving the capability-rigidity paradox in new product innovation. *J. Market.* 69 (4), 61–83.
- Audzeyeva, A., Hudson, R., 2016. How to get the most from a business intelligence application during the post implementation phase? Deep structure transformation at a UK retail bank. *Eur. J. Inf. Syst.* 25 (1), 29–46.
- Awang, Z., 2012. *A Handbook on SEM: Structural Equation Modelling*, fifth ed. Center of Graduate Studies, Kuala Lumpur.
- Bagozzi, R.P., Yi, Y., Phillips, L.W., 1991. Assessing construct validity in organizational research. *Adm. Sci. Q.* 36 (3), 421–458. <https://doi.org/10.2307/2393203>.
- Barjak, F., Niedermann, A., Perret, P., 2014. The need for innovations in business models. Final Policy Brief (Deliverable 5) to the European Commission. DG Research & Innovation 1–52.
- Ben Romdhane Ladib, N., Lakhal, L., 2015. Alignment between business model and business strategy and contribution to the performance: empirical evidence from ICT Tunisian venture. *J. High Technol. Manag. Res.* 26 (2), 168–176.
- Bianchi, M., Campodall'Orto, S., Frattini, F., Vercesi, P., 2010. Enabling open innovation in small and medium-sized enterprises: how to find alternative applications for your technologies. *R&D Management* 40 (4), 414–431.
- Bock, A.J., Opsahl, T., George, G., Gann, D.M., 2012. The effects of culture and structure on strategic flexibility during business model innovation. *J. Manag. Stud.* 49 (2), 279–305. <https://doi.org/10.1111/j.1467-6486.2011.01030.x>.
- Bouwman, H., de Reuver, M., Heikkilä, M., Fiet, E., 2020. Business Model Tooling: where research and practice meet. *Electron. Mark.* 30 (3), 413–419.
- Bouwman, H., Nikou, S., 2019. Digitalization, business models, and SMEs: how do business model innovation practices improve performance of digitalizing SMEs? *Telecommunications Policy*, 43 (9), 101828.
- Bouwman, H., Nikou, S., Molina-castillo, F.J., De Reuver, M., 2018a. The impact of digitalisation on business models. *Digital Policy, Regulation and Governance* 20 (2), 105–124. <https://doi.org/10.1108/DPRG-07-2017-0039>.
- Bouwman, H., Heikkilä, J., Heikkilä, M., Leopold, C., Haaker, T., 2018b. Achieving agility by using business model stress testing. *Electron. Mark.* 28, 149–162.
- Brettel, M., Strese, S., Flatten, T.C., 2012. Improving the performance of business models with relationship marketing efforts - an entrepreneurial perspective. *Eur. Manag. J.* 30 (2), 85–98. <https://doi.org/10.1016/j.emj.2011.11.003>.
- Bryman, A., Bell, E., 2011. *Business Research Methods*, third ed. Oxford University Press Inc, New York.

- Burnard, P., 1991. A method of analysing interview transcripts in qualitative research. *Nurse Educ. Today* 11 (6), 461–466.
- Burns, T., Stalker, G.M., 1961. *The Management of Innovation*. Tavistock, London.
- Casadesus-Masanell, R., Ricart, J., 2010. From strategy to business models and onto tactics. *Long. Range Plan.* 45 (2–3), 195–215. <https://doi.org/10.1016/j.lrp.2010.01.004>.
- Chesbrough, H., 2010. Business model innovation: opportunities and barriers. *Long. Range Plan.* 43 (2–3), 354–363. <https://doi.org/10.1016/j.lrp.2009.07.010>.
- Chesbrough, H., 2007. Business model innovation: it's not just about technology anymore. *Strat. Leader.* 35 (6), 12–17. <https://doi.org/10.1108/10878570710833714>.
- Chesbrough, H., Rosenbloom, R.S., 2002. The role of the business model in capturing value from innovation: evidence from Xerox Corporation's technology spin-off companies. *Ind. Corp. Change* 11 (3), 529–555. <https://doi.org/10.1093/icc/11.3.529>.
- Clauss, T., 2016. Measuring business model innovation: conceptualization, scale development and proof of performance. *R&D Management* 47 (3), 385–403.
- Christensen, C.M., Bartman, T., Van Bever, D., 2016. The hard truth about business model innovation. *MIT Sloan Manag. Rev.* 58 (1), 31–40.
- Cohen, W., Levinthal, A.L., 1990. Absorptive capacity: a new perspective on learning and innovation. *Adm. Sci. Q.* 35 (1), 128–152.
- Damanpour, F., Wischnevsky, J.D., 2006. Research on innovation in organisations: distinguishing innovation-generating from innovation-adopting organisations. *J. Eng. Technol. Manag.* 23 (4), 269–291. <https://doi.org/10.1016/j.jengtecman.2006.08.002>.
- Dawes, J., 1999. The relationship between subjective and objective company performance measures in market orientation research: further empirical evidence. *Market. Bull.* 10, 65–75, 1996.
- Dess, G.G., Robinson, R.B., 1984. Measuring organisational performance in the absence of objective measures: the case of the privately-held firm and conglomerate business unit. *Strat. Manag. J.* 5 (3), 265–273.
- De Reuver, M., Bouwman, H., Haaker, T., 2013. Business model roadmapping: a practical approach to come from an existing to a desired business model. *Int. J. Innovat. Manag.* 17 (1), 1–18.
- Dewald, J., Bowen, F.E., 2010. Storm clouds and silver linings: responding to disruptive innovations through cognitive resilience. *Enterpren. Theor. Pract.* 34 (1), 197–218.
- Dey, I., 1993. *Qualitative Data Analysis. A User-Friendly Guide for Social Scientists*. Routledge, London and New York.
- Duarte, P., Amaro, S., 2018. Methods for modelling reflective-formative second order constructs in PLS: an application to online travel shopping. *Journal of Hospitality and Tourism Technology* 9 (3), 295–313. <https://doi.org/10.1108/JHTT-09-2017-0092>.
- Eisenhardt, K.M., Martin, J.A., 2000. Dynamic capabilities: what are they? *Strat. Manag. J.* 21 (10–11), 1105–1121.
- European Commission, 2016. User guide to the SME definition. Ref. Ares 956541, 24/02/2016. Accessed 12.02.2021, available at: https://ec.europa.eu/regional_policy/sources/conferences/state-aid/sme/smedefinitionguide_en.pdf.
- Foss, N.J., Saebi, T., 2017. Fifteen years of research on business model innovation: how far have we come, and where should we go? *J. Manag.* 43 (1), 220–227. <https://doi.org/10.1177/0149206316675927>.
- Foss, N.J., Saebi, T., 2015. *Business Models and Business Model Innovation: the Organisational Dimensions*. Oxford University Press, pp. 1–23.
- Garfield, B., 2011. The revolution will not be monetized. *Spectrum, IEEE* 48 (6), 34–39.
- George, G., Bock, A.J., 2011. The business model in practice and its implications for entrepreneurship research. *Enterpren. Theor. Pract.* 35 (1), 83–111. <https://doi.org/10.1111/j.1540-6520.2010.00424.x>.
- Giesen, E., Berman, S., Bell, R., Blitz, A., 2007. Three ways to successfully innovate your business model. *Strat. Leader.* 35 (6), 27–33.
- Giesen, E., Riddleberger, E., Christner, R., Bell, R., 2010. When and how to innovate your business model. *Strat. Leader.* 38 (4), 17–26. <https://doi.org/10.1108/10878571011059700>.
- Gray, J.H., 1997. Small business strategy in Australia. *Acad. Enterpren. J.* 2 (2), 44–58.
- Gronum, S., Steen, J., Verreyne, M.L., 2016. Business model design and innovation: unlocking the performance benefits of innovation. *Aust. J. Manag.* 41 (3), 585–605. <https://doi.org/10.1177/0312896215587315>.
- Guo, H., Tang, J., Su, Z., Katz, J.A., 2017. Opportunity recognition and SME performance: the mediating effect of business model innovation. *R&D Management* 47 (3), 431–442. <https://doi.org/10.1111/radm.12219>.
- Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E., 2010. *Multivariate Data Analysis*, seventh ed. Prentice-Hall, New Jersey (Upper Saddle River).
- Hair Jr., J.F., Sarstedt, M., Ringle, C.M., Gudergan, S.P., 2017. *Advanced Issues in Partial Least Squares Structural Equation Modelling*, first ed. Sage Publications, Los Angeles.
- Hair, J.F., Ringle, C.M., Sarstedt, M., 2011. PLS-SEM: indeed, a silver bullet. *J. Market. Theor. Pract.* 19 (2), 139–152.
- Hair, J.F., Sarstedt, M., Kuppelwieser, V., Hopkins, L., 2014. Partial least squares structural equation modeling (PLS-SEM): an emerging tool for business research. *Eur. Bus. Rev.* 26 (2), 106–121.
- Halecker, B., Bickmann, R., Hölzle, K., 2014. Failed business model innovation – a theoretical and practical illumination on a feared phenomenon. *R&D Management Conference*, Stuttgart, Germany.
- Hartmann, M., Oriani, R., Bateman, H., 2013. *The Performance Effect of Business Model Innovation: an Empirical Analysis of Pension Funds*. 35th DRUID Celebration Conference, Barcelona, Spain.
- Heider, A., Gerken, M., van Dinther, N., Hülsbeck, M., 2020. Business model innovation through dynamic capabilities in small and medium enterprises—Evidence from the German Mittelstand. *J. Bus. Res.* <https://doi.org/10.1016/j.jbusres.2020.04.051>.
- Heij, C.V., Volberda, H., Van den Boasch, F., 2014. How does business model innovation influence firm performance: the moderating effect of environmental dynamism. *Academy of Management Annual Meeting Proceedings*.
- Heikkilä, M., Bouwman, H., Heikkilä, J., 2018. From strategic goals to business model innovation paths: an exploratory study. *J. Small Bus. Enterprise Dev.* 25 (1), 107–128. <https://doi.org/10.1108/JSBED-03-2017-0097>.
- Henseler, J., Ringle, C.M., Sarstedt, M., 2014. A new criterion for assessing discriminant validity in variance-based structural equation modelling. *J. Acad. Market. Sci.* 43 (1), 115–135. <https://doi.org/10.1007/s11747-014-0403-8>.
- Hu, B., 2014. Linking business models with technological innovation performance through organisational learning. *Eur. Manag. J.* 32 (4), 587–595. <https://doi.org/10.1016/j.emj.2013.10.009>.
- Hult, G.T.M., Hurley, R., Knight, G.A., 2004. Innovativeness: its antecedents and impact on business performance. *Ind. Market. Manag.* 33 (5), 429–438. <https://doi.org/10.1016/j.indmarman.2003.08.015>.
- Itami, H., Nishino, K., 2010. Killing two birds with one stone: profit for now and learning for the future. *Long. Range Plan.* 43 (2–3), 364–369. <https://doi.org/10.1016/j.lrp.2009.07.007>.
- Johnson, M.W., Christensen, C.M., Kagermann, H., 2008. Reinventing your business model. *Harv. Bus. Rev.* 86 (12) <https://doi.org/10.1111/j.0955-6419.2005.00347>.
- Karimi, J., Walter, Z., 2016. Corporate entrepreneurship, disruptive business model innovation adoption, and its performance: the case of the newspaper industry. *Long. Range Plan.* 49 (3), 342–360. <https://doi.org/10.1016/j.lrp.2015.09.004>.
- Kim, G., Shin, B., Kim, K.K., Lee, H.G., 2011. IT capabilities, process-oriented dynamic capabilities, and firm financial performance. *J. Assoc. Inf. Syst. Online* 12 (7), 487–517.
- Kim, M.K., Park, J.H., Paik, J.H., 2018. Factors influencing innovation capability of small and medium-sized enterprises in Korean manufacturing sector: facilitators, barriers and moderators. *Int. J. Technol. Manag.* 76 (3–4), 214–235.
- Knab, S., Rohrbeck, R., 2014. Why intended business model innovation fails to deliver: insights from a longitudinal study in the German smart energy market. In: *Proceedings of the R&D Management Conference*, Stuttgart, Germany.
- Kock, N., 2015. Common method bias in PLS-SEM: a full collinearity assessment approach. *Intention Journal of e-Collaboration* 11 (4), 1–10.
- Kumar, R., Nandakumar, M.K., Ghobadian, A., Ireland, R.D., Regan, N.O., 2018. Business model design performance relationship under external and internal contingencies: evidence from SMEs in an emerging economy. *Long. Range Plan.* 51 (5), 750–769. <https://doi.org/10.1016/j.lrp.2018.01.001>.
- Lambert, S.C., Davidson, R.A., 2013. Applications of the business model in studies of enterprise success, innovation and classification: an analysis of empirical research from 1996 to 2010. *Eur. Manag. J.* 31 (6), 668–681. <https://doi.org/10.1016/j.emj.2012.07.007>.
- Langerak, F., Hultink, E.J., Robben, H.S.J., 2004. The role of predevelopment activities in relationship between market orientation and performance. *R&D Management* 34 (3), 295–309.
- Latifi, M.-A., Bouwman, H., 2018. Business model innovation and firm performance: the role of mediation and moderation factors. In: *Proceedings of the 31st Bled Conference*, Bled, Slovenia, pp. 67–83. <https://doi.org/10.18690/978-961-286-170-4.5>.
- Lee, N., Cadogan, J.W., 2013. Problems with formative and higher-order reflective variables. *J. Bus. Res.* 66 (2), 242–247.
- Leih, S., Linden, G., Teece, D.J., 2015. *Business Model Innovation and Organisational Design: the Organisational Dimensions*. Oxford University Press, pp. 41–59.
- Lindgardt, Z., Reeves, M., Stalk, G., Deimler, M.S., 2009. *Business model innovation: when the game gets tough, change the game*. Boston Consulting Group 9. <https://doi.org/10.1108/10878570710833714>.
- Liu, Y., Han, Z., 2013. The empirical study of relationship between business model and enterprise performance. In: *Advanced Materials Research*, vol. 850. Trans Tech Publications Ltd, pp. 1078–1081, 2014. <https://doi.org/10.4028/www.scientific.net/AMR.850-851.1078>.
- López-Nicolas, C., Bouwman, H., Nikou, S., 2020. Gender differences and business model experimentation in European SMEs. *J. Bus. Ind. Market.* 35 (7), 1205–1219.
- MacBryde, J., Sabaruddin, L., Beatrice, D., 2015. *The Dark Side of Business Model Innovation*. ISPIIM Innovation Summit, Brisbane, Australia.
- Mahmood, R., Hanafi, N., 2013. Entrepreneurial orientation and business performance of women-owned small and medium enterprises in Malaysia: competitive advantage as a mediator. *Int. J. Bus. Soc. Sci.* 4 (1), 82–90. <https://doi.org/10.1177/0266242612455034>.
- Majumdar, S.K., 1997. The impact of size and age on firm-level performance. *Rev. Ind. Organ.* 12 (2), 231–241.
- Mc Dermott, C.M., Prajogo, D.I., 2012. Service innovation and performance in SMEs. *Int. J. Oper. Prod. Manag.* 32 (2), 216–237.
- Methlie, L.B., Pedersen, P.E., 2008. Business model performance: reflections from three studies of mobile data services. *Nordic and Baltic Journal of Information and Communications Technologies* 2, 23–38.
- Miller, D., 2011. Miller (1983) revisited: a reflection on EO research and some suggestions for the future. *Enterpren. Theor. Pract.* 35 (5), 873–894.
- Mitchell, D., Coles, C., 2003. The ultimate competitive advantage of continuing business model innovation. *J. Bus. Strat.* 24 (5), 15–21.
- Murphy, G.B., Triller, J.W., Hill, R.C., 1996. Measuring performance in entrepreneurship research. *J. Bus. Res.* 36 (1), 15–23.
- Neely, A., 2008. Exploring the financial consequences of the servitization of manufacturing. *Operations Management Research* 1 (2), 103–118.
- OECD, 2018. *Promoting innovation in established SMEs*. Policy note. In: *SME Ministerial Conference*.

- Ordanini, A., Micelli, S., Di Maria, E., 2004. Failure and success of B-to-B exchange business models: a contingent analysis of their performance. *Eur. Manag. J.* 22 (3), 281–289.
- Osterwalder, A., Pigneur, Y., Tucci, C.L., 2005. Clarifying business models: origins, present, and future of the concept. *Commun. Assoc. Inf. Syst.* 16, 1–25. <https://doi.org/10.17705/1CAIS.01601>.
- Parker, C., 2000. Performance Measurement. Work Study.
- Petticrew, M., Roberts, H., 2008. *Systematic Reviews in the Social Sciences: A Practical Guide*. John Wiley & Sons.
- Philip, G., Mckeown, I., 2004. Business transformation and organizational culture: the role of competency, IS and TQM. *Eur. Manag. J.* 22 (6), 624–636.
- Porter, M.E., 1990. The competitive advantage of nations. *Compet. Intell. Rev.* 1 (1), 14, 14.
- Pucci, T., Nosi, C., Zanni, L., 2017. Firm capabilities, business model design and performance of SMEs. *J. Small Bus. Enterprise Dev.* 24 (2), 222–241. <https://doi.org/10.1108/JSBED-09-2016-0138>.
- Robu, M., 2013. The dynamic and importance of SMEs in economy. *The USV annals of economics and public administration* 13 (1), 84–89, 17.
- Ross, J.W., Weill, P., Robertson, D., 2006. *Enterprise Architecture as Strategy: Creating a Foundation for Business Execution*. Harvard Business School Press.
- Subramanian, A., 1996. Innovativeness: redefining the concept. *J. Eng. Technol. Manag.* 13 (3/4), 223–243.
- Teece, D.J., 2007. Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance. *Strat. Manag. J.* 28 (13), 1319–1350.
- Teece, D.J., 2010. Business models, business strategy and innovation. *Long. Range Plan.* 43 (2–3), 172–194. <https://doi.org/10.1016/j.lrp.2009.07.003>.
- Teece, D.J., 2012. Dynamic capabilities: routines versus entrepreneurial action. *J. Manag. Stud.* 49 (8), 1395–1401. <https://doi.org/10.1111/j.1467-6486.2012.01080.x>.
- Teece, D.J., Pisano, G., Shuen, A., 1997. Dynamic capabilities and strategic management. *Strat. Manag. J.* 18 (7), 509–533.
- Terrenghi, N., Schwarz, J., Legner, C., Eisert, U., 2017. Business model management: current practices, required activities and IT support. At 13th International Conference on Wirtschaftsinformatik, pp. 972–986.
- Thompson, J.D., 1967. *Organizations in Action: Social Science Bases of Administrative Theory*. McGraw-Hill, New York.
- Torres, R., Sidorova, A., Jones, M.C., 2018. Enabling firm performance through business intelligence and analytics: a dynamic capabilities perspective. *Inf. Manag.* 55 (7), 822–839.
- Velu, C., 2015. Business model innovation and third-party alliance on the survival of new firms. *Technovation* 35, 1–11. <https://doi.org/10.1016/j.technovation.2014.09.007>.
- Venkatraman, N., Ramanujam, V., 1986. Measurement of business performance in strategy Research : a comparison of approaches Massachusetts institute of technology. *Acad. Manag. Rev.* 11 (4), 801–814.
- Vukanović, Z., 2016. Business model research agenda positioning: conceptual frameworks, functions, benefits, rationale, dynamics, performance, and economic feasibility. In: *Foreign Direct Investment Inflows into the South East European Media Market*. Springer, Cham, pp. 5–66.
- Waldner, F., Poetz, M.K., Grimpe, C., Eurich, M., 2015. Industry Structure and Business Model Innovation Antecedents and Consequences of Business Model Innovation: the Role of Industry Structure. At DRUID15 conference, Rome, Italy.
- Webster, J., Watson, R.T., 2002. Analyzing the past to prepare for the future: writing a literature review. *MIS Q.* 26 (2) (xiii–xxiii).
- Wei, Z., Song, X., Wang, D., 2017. Manufacturing flexibility, business model design, and firm performance. *Int. J. Prod. Econ.* 193, 87–97. <https://doi.org/10.1016/j.ijpe.2017.07.004>.
- Zott, C., Amit, R., 2008. The fit between product market strategy and business model: implications for firm performance. *Strat. Manag. J.* 29 (1), 1–26. <https://doi.org/10.1002/smj.642>.
- Zott, C., Amit, R., 2007. Business model design and the performance of entrepreneurial firms. *Organ. Sci.* 18 (2), 181–199. <https://doi.org/10.1287/orsc.1060.0232>.
- Zott, C., Amit, R., 2003. Business Model Design and the Performance of Entrepreneurial Firms. working paper series INSEAD-Wharton Alliance Center for Global Research & Development.
- Zott, C., Amit, R., Massa, L., 2011. The business model: recent developments and future research. *J. Manag.* 37 (4), 1019–1042. <https://doi.org/10.1177/0149206311406265>.