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The role of ERP in business model innovation: Impetus or impediment

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ABSTRACT

Purpose: This research explores the moderating role of Enterprise Resource Planning (ERP) in (Business Model (BM) innovation by comparing two groups of Small and Medium-sized Enterprises (SMEs) that are still in the process of considering adoption of ERP or already have implemented ERP. In particular, the aim is to see whether ERP enables or hampers the relationship between BM experimentation, i.e. the process of BM innovation, and BM performance. An important mediator, with a focus on downstream value delivery and creation, is the novelty of the BM in question.
Design/methodology/approach: This research is based on a large quantitative study among Spanish firms that are engaged in BM innovation activities and in different phases of implementing ERP. A representative sample of 208 Spanish firms engaged in Business Model Innovation from different sectors was used to collect data, which was analysed using heterotrait-monotrait (HTMT) for scaling and Structural Equation Modelling (SEM) for model testing.
Findings: Quantitative findings show that there is a direct positive impact of BM experimentation on BM performance for firms that did not implement an ERP, while downstream novelty leads to improved value capture due to increased efficiency and the associated cost reduction. By contrast, firms with ERP show a better performance, depending on the degree of the downstream novelty of the BM.
Originality/value: There is no previous research exploring the moderating role of ERP in BM Innovation for SMEs. This is the first study to examine whether BM experimentation affects BM performance and value capturing, as mediated by BM novelty and moderated by implementation by ERP.

1. Introduction

Over time, many software applications have been developed to strengthen innovation within firms (Ghezzi & Cavallo, 2020; Szopinski, Schoormann, John, Knackstedt, & Kundisch, 2020), with some of them combined in application suites like Enterprise Resource Planning (ERP). ERP systems include various applications, from customer relationship management (CRM) to sourcing, manufacturing and forecasting, and allow for real-time data sharing by all entities involved in a given supply chain (Brenner, 2018). ERP suites combine multiple functionalities and help organizations perform tasks and processes more efficiently (Beheshti, 2006), realize costs reductions (Sun, Ni, & Lam, 2015) and improve relationships with suppliers and customers alike (Fui-Hoon Nah, Lee-Shang Lau, & Kuang, 2001), often leading to process standardization, (redesigned) processes that are too formal (Brown & Duguid, 2017), and interlocked relationships. However, ERP, because of its complex modular and architectural nature, has some drawbacks, leading to some well-known problems involving implementation (Sumner, 2000). In SMEs with limited IT knowledge, limited financial and human resources, limited skillsets, limited access to R&D and innovation capabilities, and a lack of (process) standardization (Arbussa, Bikfalvi, & Marquès, 2017), these implementation problems become explicit/ ERP has extensively been studied from a Business Process Innovation or redesign perspective, but rarely in relation to Business Model Innovation, as we shall see in the literature section.

Firms, including SMEs (Beheshti, 2006), are looking to gain a competitive advantage (Cosenz & Noto, 2018), by reformulating their business model (BM) through experimentation and innovation (Weking et al., 2020). The business environment (Martins, Rindova, & Greenbaum, 2015) and competitive pressure are more volatile than ever (Acar, Tarim, Zaim, Zaim, & Delen, 2017), which in turn forces organizations to make adjustments or radical changes to their BM (Velu & Jacob, 2014). Innovating the BM, defined as the business logic to create, deliver and capture value (Teece, 2010), is also critical to firms wanting to take advantage of technological advances in the digitalization domain, such as Ind 4.0 (smart industries), Big Data or IoT (Bouwman, Nikou, Molina-Castillo, & de Reuver, 2018), either as a driver or enabler (Bouwman, Nikou, & de Reuver, 2019; Chesbrough & Rosenbloom, 2002; Ghezzi & Cavallo, 2020). BM Innovation, can be defined as "*designed, novel and non-trivial changes to key*

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elements of a firm's business model and/or architecture linking these elements" (Foss & Saebi, 2017, p. 201). BM innovation relates to the scope and novelty of a BM (Foss & Saebi, 2018), is focused on novel configurations that differ from competitors (Voelpel, Leibold, Tekie, & Von Krogh, 2005) and that can be new to the firm (Giesen, Berman, Bell, & Blitz, 2007) or industry (Foss & Saebi, 2018). In this paper, we focus on the moderating role of a specific standard digital technology that is essential to most firms, i.e. ERP, in the role as an enabler (or inhibitor) of BM innovation Although many papers are dedicated to rather advanced digital technologies and digital transformation, as mentioned before, for many companies, specifically SMEs, adopting and implementing ERP are still on their agenda as well as on that of researchers (Bouwman, de Reuver, Heikkilä, & Fielt, 2020).

Research into ERP has emphasized the importance and advantages of ERP for an organization (Koch, 1996). However, ERP implementation is not only a technical system implementation but also an organizational one, often leading to Business Process Reengineering (BPR) (Wong, Scarbrough, Chau, & Davison, 2005). ERP implementation processes can be hard for companies (Scott & Wagner, 2003), for instance when specific ERP software does not match the existing operational model, needs to be aligned with business processes or integrated with other applications, e.g. management information or knowledge-management systems (Newell, Huang, Galliers, & Pan, 2003), and requires changes in the Enterprise Architecture, which consists of applications, such as ERP suites, and supporting Information and IT infrastructure (Verhagen, de Reuver, & Bouwman, 2022). Similarly, BMs focus on how technical systems, like ERP's, and organizational operational models, with a focus on processes, key activities and tasks (Al-Debei & Avison, 2010), are combined to create and provide value.

Since ERP is directly related to business operations, it may be an impetus to BM Innovation, e.g. the implementation of changes in BM components, such as business processes and key activities, and related to changes in enterprise and information architectures. However, in practice, the required high level of standardization and integration of business components, business processes and applications, can lead to increased complexity and increased dependency on ecosystem partners and their technical systems, and result in inertia, and as such impede BM innovation. More specifically, the close connection of ERP applications with business processes and highly formalized key activities may hinder BM experimentation, i.e. the ***process*** of innovating a BM, as well as its ***discrete outcome***, i.e. the novel, innovated or redesigned BM.

As such, in this paper, we are interested in seeing whether ERP implementation hinders or leads to BM experimentation, i.e. the process involved in BM innovation, and in turn improves BM performance, for instance in terms of sales and profit growth, and increase value capturing, based on increased efficiency and reduced costs. We introduce the latter distinction between performance related to growth and to value being captured as the result of reduced costs. We do so in response to Zott, Amit, and Massa (2011), who argued that researchers should present BM concepts with much greater clarity to gain a deeper understanding of firm's performance. We also quantitatively explore the suggestion by Heikkilä, Bouwman, and Heikkilä (2018) that growth strategies, i.e. value creation by new markets, and profit strategies, i.e. capturing value based on efficiency gains, work out differently in terms of the BM innovation processes.

Our focus is on SMEs, for a number of reasons. SMEs play a vital role in wealth and job creation in most developed and developing economies. Since the most recent data from Eurostat (2017) that was available at the time of writing this paper indicates that 34% of all EU enterprises used ERP software applications, ranging from 28% of small enterprises to 76% of large enterprises (Eurostat, 2017), SMEs are most likely to still be considering ERP in relation to BM Innovation. Also, data on OECD countries confirm that ERP is popular among large firms (more than 75% adoption rate in 2014) but used to a lesser extent by SMEs (less than 20%) (Llinás Sala & Abad Puente, 2019). There are numerous examples that show that SMEs only use a single or limited set of functionalities provided by ERP, for instance, CRM modules, or have yet to implement ERP in their business processes and activities (Hallikainen, Kivijärvi, & Tuominen, 2009). Moreover, literature on BM shows that SMEs are innovating more and more when it comes to their BM (Heikkilä & Bouwman, 2018) and are well-positioned because SMEs are less hierarchical, may be more efficient from an organizational perspective, are more flexible, and have shorter communication lines (Sebora, Hartman, & Tower, 1994).

BM Innovation, on the other hand, can be motivated by a need to formalize processes and prepare the SME for ERP implementation. Alternatively, SMEs that have already implemented ERP solutions may be hindered by formalized processes which make innovation of SMEs BM more complex. As such, when it comes to examining the role of ERP in BM innovation, SMEs are more likely to fit our research objective.

Literature on BM Innovation and ERP (implementation) is limited and is discussed in more detail below. However, to the best of our knowledge, no study has examined the detrimental or beneficial role of ERP in BM innovation processes and related performance, i.e. growth vis-à-vis value capturing related to cost savings, for SMEs, which is why our research question is:

Does BM experimentation affect BM performance and value capturing, as mediated by BM novelty and are these relations moderated by the implementation of ERP?

Our research objective is to empirically test two alternative moderation models, for SMEs that did and did not implement ERP, based on the core concepts mentioned.

To address the research gaps mentioned above, answer the research question and realize our objective, the paper is organized as follows. First, we discuss the theoretical background, including a summary of the main contributions in the field of ERP, followed by a brief discussion of BM innovation. In this section, we also describe the main constructs of the model. Next, we explain the study's hypotheses and theoretical model. In the third section, the methodology is discussed, along with the main results. In the final section, we discuss the findings and theoretical and practical implications, as well as the limitations of this study.

2. Theoretical background

In this study, we first explain core concepts, starting from ERP implementation, and discuss the related literature. Research into ERP implementation has been extensive and came to a halt in the first decade of this century, around the same time BM thinking emerged. We make the shift towards Business Model literature and the role of (information) technology in BM innovations. Finally, we focus on the role of ERP in BM Innovation, mainly by looking at the qua volume and focusing on rather limited existing literature. Although information technology innovation is often considered a key driver, attention is rarely paid to the role legacy systems like ERP play as possible impediments, even though ERP implementation can also force SMEs to reconsider their BM, specifically with regard to key activities and processes, upstream or downstream.

2.1. Enterprise resource planning inside the firm

Enterprise resource planning (ERP) is a software suite that is able to identify, collect, integrate, structure, stock and process data of different kinds of departments within a company, and provide employees with the information they need in an appropriate and timely manner (Acar et al., 2017). As such, ERP integrates and coordinates inter-organizational processes involving suppliers and customers, improving the information flows and reducing time and costs in communication (Migdadi & Abu Zaid, 2016). ERP software, which is modular in nature, is offered by various providers in the form of standard software suites (Hyvönen, Järvinen, & Pellinen, 2006). Some providers even offer technologies for BMI, such as BM mining software (Fleig, Augenstein, & Maedche, 2018) or open-source ERP (Deodhar et al., 2012). According to Saeed et al. (2017, p. 54), "*ERP, as a business process management software suite. enables the organization to use applications of the integrated business management system and to automate most back-office functions related to technology, services and human resources. ERP is a computer information application that backups, coordinates*

numerous features of workflow, along with financial records, production strategy, material management, trading, distribution and human resource management." ERP software not only allows firms and individual employees to acquire (Menz et al., 2021), organize, manage and share large volumes of important data (Acar et al., 2017) at reduced costs (Menz et al., 2021), it also connects all of the firm's activities, processes and information (Nazir & Pinsonneault, 2012), and can even contribute to sustainability (Chofreh, Goni, & Klemeš, 2018). Since the early 2000's, there has been extensive research into ERP from an organizational, managerial and individual perspective, discussing, for instance, its adoption (Romero & Vernadat, 2016), implementation (Momoh, Roy, & Shehab, 2010), use (Elbertsen, Benders, & Nijssen, 2006) and effects (Wieder, Booth, Matolcsy, & Ossimitz, 2006), in general terms or by looking at specific business functions like manufacturing, accountancy, resource planning or customer relationship management. Moreover, ERP has been studied within the context of both large enterprises and SMEs (Zach, Munkvold, & Olsen, 2014). It has been found that ERP can deal with multiple firm functionalities at the same time (Chung, Skibniewski, Lucas, & Kwak, 2008), build a competitive advantage through improved resource management (Hunton, Lippincott, & Reck, 2003) or enhance an organization's value to investors (McEwen, Hunton, & Wier, 2002), in addition to which ERP increases the reliability of internal control to enhance enterprises' positive brand image and sustainable operations (Huang, Chiu, Chao, & Arniati, 2019). However, the integration of an organization with upstream suppliers and downstream customers implies that ERP must deal with complex processes, in part because of the connection of multiple units (Chen, Law, & Yang, 2009) in or across organizational boundaries. As a result, the ability to create a competitive advantage frequently forces organizations to make a decision in favour of or against ERP implementation (Lengnick-Hall, Lengnick-Hall, & Abdinnour-Helm, 2004). As far as SMEs are concerned, Supply Chain Management (SCM) software, as part of the adoption, implementation and use of ERP, is often forced upon them by dominant players (Buonanno et al., 2005) and increases switching costs (Molina-Castillo et al., 2012) in the supply chain. Moreover, Hopkinson, Zils, Hawkins, and Roper (2018) found that the extent to which the process is automated by ERP, the prioritization and routing of assets through the cascade requires continual iterations of manual intervention and management decisions. Earlier studies also reported contradictory results in the relationship between ERP implementation (Scott & Wagner, 2003) and organizational performance (see also Sun et al., 2015). As a result, small firms in particular are often less prone to adopt and implement ERP. The use of Customer Relation Management (CRM) software, mainly for operational and, to a lesser extent, for marketing purposes, follows the adoption of ERP in Europe more closely, i.e. ERP is adopted by 34% of the enterprises, followed closely by CRM (32%), while upstream SCM adoption is only 12% (Eurostat, 2017). By contrast, Westerlund (2020) suggests that ERP is less widely adopted than CRM. Either way, ERP software allows firms to organize, manage and share important data (Acar et al., 2017), connects all their functions and information (Nazir & Pinsonneault, 2012) and, as such, supports management information and knowledge management systems. Few studies have looked at what happens after ERP implementation. These studies are mostly related to process redesign (Teittinen, Pellinen, & Järvenpää, 2013).

However, the available data shows that SMEs continue to lag behind the generic trend in terms of adopting, implementing and using ERP, although ERP systems are more affordable than ever (Soto-Acosta, 2020) and standard digital technology (Dressler & Paunovic, 2020). As such, it is interesting to note that most academic research into SMEs and ERP, as well as research into ERP itself, is not very recent, as indicated by our systematic literature search (Buonanno et al., 2005). This is all the more striking since new technologies, including instance cloud technologies, make the adoption, implementation and use of ERP solutions less complex and easier to handle. Applications such as software as a service (SaaS), cloud-based ERP solutions and integration of ERP, with technologies like Radio Frequency Identification (RFID), increase the pace of change (Ghezzi & Cavallo, 2020) and frequently force firms to adapt their BMs (Kuk & Janssen, 2013).

The relationship between technological innovation, both as a driver and as an enabler, and BM innovation has been studied quite extensively (Afuah, 2002; Chesbrough, 2010; De Reuver, Bouwman, & MacInnes, 2009). Although BM innovation is synonymous with being a technology-based business (De Oliveira Santini, Kretschmer, & Marconatto, 2020), practitioners struggle to exploit technological innovations because they fail to engage in BM innovation (Chesbrough & Rosenbloom, 2002) and need to find a match between enabling technology and BM innovation (Achtenhagen, Melin, & Naldi, 2013), to explore how technology can reduce costs as a part of BM innovation (Cosenz & Noto, 2018), and, on a more generic level, examine how technology and BM innovation affect BM performance (Zott & Amit, 2008). In this paper, we focus on ERP as enabling technology in relation to BM innovation.

To our knowledge, the relationship between an enabling technology, like ERP, and BM Innovation has only been subject of research in a rather limited set of studies. These studies are based on various, fairly eclectic perspectives. The studies are mainly qualitative, e.g. case studies, and descriptive in nature and often focus on large firms (see, for example, Muhic & Bengtsson, 2021) or on specific industries, e.g. low-cost airlines (Rodríguez-García, Orero-Blat, & Palacios-Marqués, 2020). Some studies focus on a specific outcome of ERP implementation and use, e.g. BMs for ecological sustainability (Chofreh et al., 2018; Huang et al., 2019). Recently, Muhic and Bengtsson (2021) illustrated BMI in two companies based on cloud sourcing of functionalities, such as ERP, with a focus on BM Innovation stages. Rodríguez, Molina-Castillo, and Svensson (2020a, 2020b) focus on the relationship between implementation of ERP with a focus on organizational adaptation and resistance, the BM evolution, e.g. value generation and organizational complexity, and operational performance, Our research is an extension of the latter studies. In the following section, we explore existing BM literature and relevant concepts in more detail, before moving on to our hypotheses.

2.2. Business model innovation, experimentation, novelty and performance

In the last decade, there has been a lot of attention to the definition of the BM concept (Foss & Saebi, 2017), ontologies (Bouwman, Haaker, & De Vos, 2008; Osterwalder & Pigneur, 2010), meta-models (Bouwman et al., 2020), taxonomies and patterns (Remane, Hanelt, Tesch, & Kolbe, 2017), BM components (Onetti, Zucchella, Jones, & McDougall-Covin, 2012), and BM design (Bouwman et al., 2008) or innovated (Heikkilä et al., 2018). At the same time, there has been an ongoing debate as to how to define and measure the BM innovation concept (Clauss, 2017; Spieth & Schneider, 2016; Zott & Amit, 2007, 2008) and closely related concepts correctly, from BM development to BM renewal, as discussed by Priem, Wenzel, and Koch (2018) or Business Model dynamics (De Reuver et al., 2009), life cycles or BM creation, extension, revision and termination (Cavalcante, Kesting, & Ulhøi, 2011).

The BM definition provided by Teece (2010, p. 172), as a company's logic on how to create (what for whom, how), deliver and capture value, or, to put it in more classic economic and strategic terms, how to appropriate value (see also Osterwalder & Pigneur, 2010), is broadly accepted in strategic management and entrepreneurship literature. Teece (2010, p.173) also states that *"BM innovation can itself be a pathway to competitive advantage if the model is sufficiently differentiated and hard to replicate for incumbents and new entrants alike"*. Amit and Zott (2001) highlight the idea that BM innovation relies on creating or modifying activity systems, are useful to show what physical processes and activities are involved in creating value (Al-Debei & Avison, 2010), as well as serving as a starting point for understanding when information and knowledge need to be shared (Solaimani, Heikkilä, & Bouwman, 2018). From an information system perspective, activity systems help us understand how the BM architecture and components can be supported by processes, i.e. key activities, information systems, software solutions like ERP or SaaS, and enterprise architectures (Verhagen et al., 2022). However, research into ERP, SaaS and cloud computing in relation to BMs focuses mainly on the BM of the providers of these technologies, e.g. on the business models of the IT industry and software

providers (see, for instance, Kranz, Hanelt, & Kolbe, 2016). Our focus, on the other hand, is on the BM innovation of SMEs that have (or have not) implemented traditional ERP, cloud-based or SaaS solutions to support their key activities and processes. We draw a distinction between BM and BM Innovation: a renewed BM as the *discrete outcome* of a BM innovation process. We label the latter, the innovation process, ***BM experimentation***. Innovations in the core components of a Business Model or their architectural configuration require BM experimentation to achieve reliable, often complex models that outperform previous BMs and may produce a competitive advantage (Kuk & Janssen, 2013).

Many internal and external factors, including market-related, technological and regulatory dynamics and uncertainties, as well as strategic choices and innovation capacity, may force a firm to adjust its BM (Bouwman et al., 2018; Martins et al., 2015) and experiment with alternative BMs (Sosna, Trevinyo-Rodriguez, & Velamuri, 2010), on paper or in practice (Berends, Smits, Reymen, & Podoynitsyna, 2016; Martins et al., 2015), either within an experimental setting or by developing parallel BMs (Snihur & Tarzijan, 2018). In essence, those firms explore which BM components can be changed or combined, and how, to create an ideal configuration (Chesbrough, 2010). BM tools can be useful in this type of experimentation (Bouwman et al., 2020). To capture BM experimentation (Molina, de Reuver, Bouwman, & Clavel, 2022), we look at its presence, as well as that of a specific team engaged in BM experimentation (Kuk & Janssen, 2013) and any available budgets (Teece, 2010) being allocated to identify alternative configurations, as a proxy for BM experimentation.

Every BM consists of interconnected components (Amit & Zott, 2001) that reflect a firm's underlying logic (Teece, 2010) and its activity system. A simple, incremental change in one component, for instance replacing one logistical partner for another, in itself will not lead to a radical change in the way the firm creates, delivers and captures value. For that to happen, the change needs to affect the business logic and, according to some, in essence, it needs to be radical in nature (Taran, Boer, & Lindgren, 2015). A company can change a single firm component, for instance adding a social media channel or make several changes in multiple components that redesign the BM architecture, for instance when a production company becomes a service provider (Foss & Saebi, 2018). In essence, the number of components being affected and the impact on the basic architecture of the BM define the level of complexity (Johnson, Christensen, & Kagermann, 2008; Zott & Amit, 2008). Moreover, a third important dimension, as suggested by Taran et al. (2015), is the disruptiveness of the BM changes to the firm, industry or society at large, in other words, its reach. In line with these arguments, the novelty of a BM change can be assessed in terms of how radical, complex and far-reaching the changes are (Taran et al., 2015) that an organization implements in its BM to transact and interact with its customers (Johnson et al., 2008), and outperform its competitors (Zott & Amit, 2008).

Ultimately, BM experimentation and the new discrete BM should lead to improved business performance in terms of growth and/or the firm's ability to value capture due to cost reduction. One of the main reasons to innovate in a BM is to try and ensure a profitable and sustainable performance (Clauss, 2017). On the one hand, in this study, we assess BM performance, based on the subjective assessment by managers, in terms of how changes in the BM lead to increased sales and profit growth (Drnevich & Kriauciunas, 2011; Latifi, Nikou, & Bouwman, 2021; Protogerou, Caloghirou, & Lioukas, 2012). On the other hand, as Heikkilä et al. (2018) argue, the focus is not only on growth, but also on capturing value through cost reduction. As such, the changes in BM could be aimed at capturing value through an improved configuration of variable and fixed costs (Latifi et al., 2021; Lindgardt, Reeves, Stalk, & Deimler, 2009). To summarize, the basic model addresses the relationship between BM experimentation, the novelty of the BM in question and firm performance from a growth perspective as well as from a cost reduction perspective.

3. Hypotheses

In general, literature proposing a relationship between BM experimentation or innovation, and performance is quite extensive. This relationship has been hypothesized and empirically researched extensively, for instance in Bouwman et al. (2019, 2020), Clauss (2017), Guo, Tang, Su, and Katz (2017), Lopez-Nicolas, Nikou, Molina-Castillo, and Bouwman (2020), Pucci, Nosi, and Zanni (2017), Verhagen et al. (2022), and Zott and Amit (2008). This body of literature is summarized in Latifi et al. (2021), among others. However, to be more specific, the literature states that, to achieve profitable and sustainable business performance (Huang, Lai, Kao, & Sung, 2014), firms must be able to experiment (Berends et al., 2016; Zubac, 2017) and continuously innovate their BM to reduce both risks and costs (Bojovic, Genet, & Sabatier, 2018). For SMEs, as for other firms, BM experimentation (Bouwman et al., 2019; Molina et al., 2022) implies an explorative and opportunity-seeking behaviour (Guo et al., 2017), as well as a search for novel and alternative BMs, their components and/or architecture. Changes in BM components or their architectural configuration have a positive effect on a firm's performance in terms of sales and growth (Latifi et al., 2021; Pati, Nandakumar, Ghobadian, Ireland, & O'Regan, 2018), which also applies to SMEs (Pucci et al., 2017).

However, experimentation designed to improve business activities, processes and partnerships (Giesen et al., 2007), with a focus on meeting customer demands (Sorescu, Frambach, Singh, Rangaswamy, & Bridges, 2011), may vary depending on a firm's specific characteristics, resources and capabilities (Björkdahl & Holmen, 2013). Moreover, changes in BM components are driven or enabled by technologies and information systems (Migdadi & Abu Zaid, 2016). For instance, and more specifically, the introduction of ERP systems is viewed as an organizational change-related activity (Imran, Rehman, Aslam, & Bilal, 2016) that may affect internal organizational facets (Sosna et al., 2010), the configuration of BM components and value system-related processes (Al-Debei & Avison, 2010).

There are many examples of ERP implementations that aim at reducing costs by optimizing processes and, in doing so, improving performance (Diaz-Moriana, Clinton, Kammerlander, Lumpkin, & Craig, 2018). For instance, Hedman and Kalling (2003) discuss firms whose BM components are affected by the implementation of ERP software. Unfortunately, not all of these initiatives proved successful (Hedman & Kalling, 2003). The reason some failed could be that implementing an ERP system is a complex process (Chen et al., 2009), one that may affect multiple BM components differently. Improvements in one BM activity may have a negative impact elsewhere (Kalling, 2003), making the ERP implementation less successful, and that could be more critical for SMEs, which are highly dependent on ERP providers and their requirements regarding the standardization of processes, and which are more likely to have limited resources at their disposal. SMEs may therefore be less likely to experiment with their BMs (Pati et al., 2018). However, if they do experiment with their BM because a high level of standardization has already been achieved, it may be easier to experiment with BM components, the results may be easier to consolidate and the firms involved may be more effective in developing an alternative BM. Based on these arguments, we observe that there is evidence that firms that have adapted to the standardised rules of the ERP software (Hyvönen et al., 2006) have a deeper insight into their business logic and could be more likely to experiment with different BM components. However, a high level of standardization may hinder experimentation, due to the complexity involved (Rodríguez et al., 2020b) and based on the notion *'if it ain't broke, don't fix it'*. By contrast, firms that do not use ERP software will be more flexible when it comes to experimenting with their BM (Hong & Kim, 2002), while at the same time suffering from a lack of standardization and, as a result, have a more diffuse and less shared perception of the core business logic. Because the BM innovation process forces firms to reconsider their key activities, their choice of partners in a supply chain and communication and transaction with customers, and related BM components, they may find it easier to reap the rewards. Accordingly, we suggest that the effect of BM experimentation on BM performance is expected to be more explicit for companies without ERP. The following hypothesis is proposed:

H1: The positive impact of business model experimentation on business model performance will be stronger for firms without implemented enterprise resource planning solutions.

Firms that experiment with their BM may want to achieve a better value capture configuration in terms of cost structure (Bojovic et al., 2018) and profitability (Heikkilä et al., 2018). BM experimentation can reduce a firm's risks and costs and anaffect the novel BM cost structure. Through experimentation, firms can test, generate and exploit opportunities to create and capture customer value (Helms, 2016). BM experimentation can be designed as a low-risk (thought) experiment and, as such, may be inexpensive to implement (Bojovic et al., 2018). Through BM experimentation, the firm proposes and validates potential changes in its BM and BM components. If the BM experimentation shows a positive result, e.g. value capture, the firm can shift resources to the new, discrete BM (Björkdahl & Holmen, 2013), with a subsequent effect on cost structure.

Firms that have implemented an ERP have already reorganized their activities and revised their processes. An ERP is not only designed to add software to a firm, it is also intended to make the firm more efficient in terms of resource allocation and process redesign. In that respect, Haines (2009) highlight the importance of adapting the process of the firm to the ERP package as one of the best ways of securing a good return on investment. If a company has implemented an ERP, it will be less interested in trying to reduce costs and improve operational excellence any further (Silva & Fulk, 2012), relying instead on the changes that have already been made and the ERP function to control costs (Yen, Chou, & Chang, 2002). Therefore, we posit the following:

H2: The positive impact of business model experimentation on business model value capture will be stronger for firms without enterprise resource planning.

Firms feel a need to experiment with their business models because of environmental uncertainty and not knowing which BM adaptations could lead to improved performance. Organizations can reduce uncertainty using software like ERP, for instance in the form of CRM applications, not only to improve information processing related to transactions (Madapusi & D'Souza, 2012), but by providing timely, relevant and reliable management information as well (Galbraith, 2002). However, because implementing any ERP system is a complex process of adoption, implementation and use (Chen et al., 2009), it is clear that an ERP can affect multiple BM components (Hedman & Kalling, 2003). In this paper, the focus is on novelty and, more specifically, novelty downstream, i.e. "*putting value creation for consumers centre stage*" (Priem et al., 2018). Accordingly, the capacity of ERP software to properly manage customer processes and provide customer-related management information, allows a firm to experiment with its BM. In this paper, we look specifically at the delivery and capture of value from customer processes and segments, as enabled by applications like CRM modules, in combination with social media and Big Data (analytics).(Bouwman et al., 2018). CRM applications are more easily implemented and controlled by SMEs themselves, in contrast to Supply Chain Management, which is often imposed on SMEs by suppliers. As such, firms that have implemented ERP software are expected to benefit from BM downstream novelty, as also proposed by Pucci et al. (2017), Therefore, we propose the following hypothesis:

H3: The positive impact of business model experimentation on business model downstream novelty will be stronger for firms that have implemented enterprise resource planning.

BM novelty (Snihur & Tarzijan, 2018) has to be triggered and managed (Ghezzi & Cavallo, 2020). Because of customer demand, ERP providers are offering systems with more novel functionalities, depth and modular integration (Madapusi & D'Souza, 2012, to realize a closer alignment between business logic and business processes (Solaimani & Bouwman, 2012). ERP systems may help handle internal and external complications and enhance the positive effect of BM novelty on BM performance (Helms, 2016). According to Acar et al. (2017), one of the primary functions and advantages of implementing an ERP software is its capacity for processing information more accurately. Therefore, ERP is more than a software suite alone, it is above all a systemic concept that improves operational performance (Stratman & Roth, 2002). According to Seethamraju and Krishna Sundar (2013), and Chung et al. (2008), ERP software is one of the most important technological tools to allow firms to adapt to new business opportunities. Based on the abovementioned suggestion, we expect that firms that have implemented an ERP will benefit in a more positive way from business model novelty and from increased BM performance.

H4: The positive impact of business model novelty on business model performance will be stronger for firms using enterprise resource planning.

Firms with a higher level of BM novelty (Snihur & Tarzijan, 2018) face competition for resources and assets (Helms, 2016) and incur higher (fixed and variable) costs (Pati et al., 2018). BM novelty could be addressed appropriately through ERP, because it can integrate an organization's information needs from all the functional departments (Rodriguez et al., 2020a). Firms implementing ERP are motivated by a desire and constantly searching for ways to reduce operational costs (Kranz et al., 2016). It has been confirmed that the benefits of ERP implementation involve better resource integration, better stock management and improved productivity because of formalized organizational processes (Uwizeyemungu & Raymond, 2010). All three effects mentioned above lead to cost reduction thanks to better time management, fewer errors, prevention of double entries and less time spent on sales and procurement (Badewi, Shehab, Zeng, & Mohamad, 2018). As such, ERP promises more and better-organized information and helps firms reduce costs (Kim, 2009). O'Leary (2004), in his discussion of ways in which ERP implementation helps reduce cost as an intangible benefit, argues that an excessively high-cost structure is one of the main reasons why firms are advised to implement ERP (Kim, 2009). Moreover, when considering implementing ERP software to support business model innovation (Martins et al., 2015), firms are likely to review the existing (fixed and variable) cost structure as well (Yen et al., 2002), which brings us to our next hypothesis:

H5: The positive impact of business model novelty on business model value capturing will be stronger for firms with enterprise resource planning.

To test the relationships listed above, we propose the following model (see Fig. 1).

4. Methodology

This research is based on a quantitative study among Spanish SMEs involved in BM innovation that either have or have not implemented enterprise resource planning. Data was collected for this population through a questionnaire among a representative sample of 208 Spanish firms from several economic sectors (response rate was about 36%). We followed a two-step approach in collecting the data. First, we made use of a sample framework as provided by Dun and Bradstreet. The SMEs included in the research were randomly selected from this database. The included firms had to match the definition of an SME as proposed by the European Union. This sample was complemented with data from an ERP provider. As a next step, we used a set of selection questions to establish if the respondents in this sample have been engaged in BM Innovation in the last two years, As a result 8% of the companies from the sample frame actually met our requirement, as being involved in BM Innovation (see also Molina et al., 2022). The companies operate in 17 different industries, agriculture excluded, and the distribution between industries is rather skewed. Due to the small numbers of some industries, this variable cannot be used as a control variable. In a related study (Latifi et al., 2021) it was shown that only size was relevant. Although the difference between start-up and established is mentioned by Latifi et al. (2021), this distinction strongly correlates with size. In another related study, Lopez-Nicolas et al. (2020) mentioned gender as a moderator, but gender only played a role in the overall relationship between BM experimentation and performance. Therefore, we limited ourselves to size as a control variable.

The filter questions were included at the beginning of the questionnaire, which is found in the appendix, to determine whether the targeted

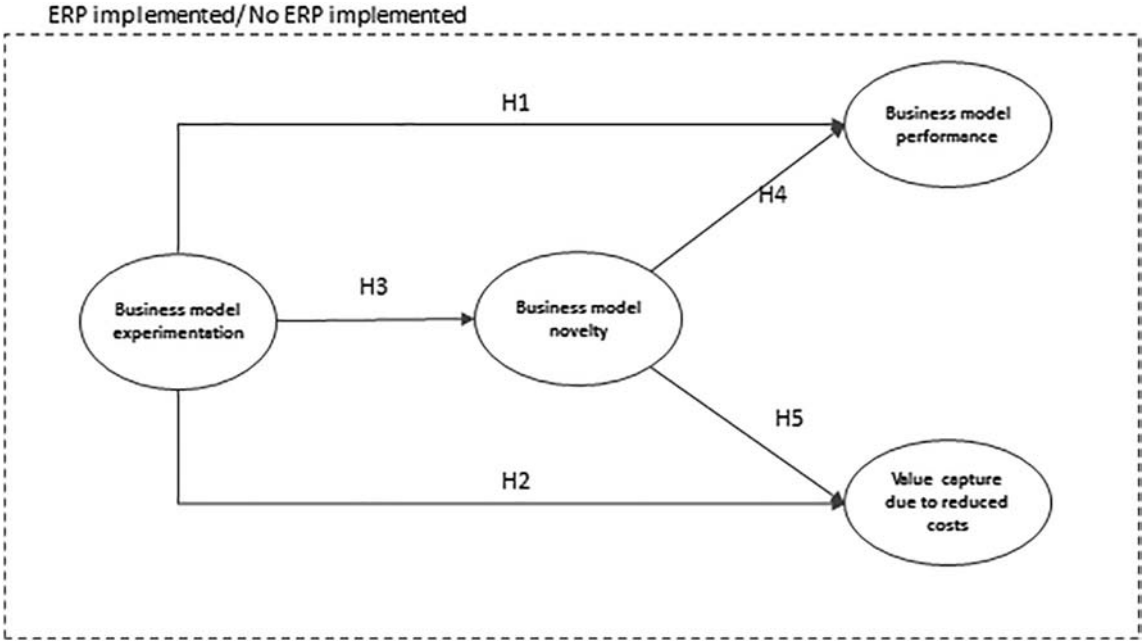

Fig. 1. Theoretical model.

companies had actually been involved in BM innovation activities in the last year and to ascertain whether the respondents had knowledge about Business Model Innovation as well as knowledge about the ERP system in their organization, if implemented (Atuahene-Gima, 2005). The respondents are either the business owner or a C-level manager, responsible for marketing, operations or information technology. Most of them are between 40 and 60 years old and have a long time experience in business. In the sample102 SMEs did not have an enterprise resource planning system, as opposed to 104 that had, we deleted two respondents since appeared to be outliers. The data were collected via a research agency using a CATI system and a questionnaire provided via a platform. Test on answer patterns between both ways of data collection didn't show significant differences.

The scales used in the questionnaire were adapted from well-known contributions in existing literature. The authors approached BM experimentation with a three-item scale that builds upon different sources (Sosna et al., 2010; Teece, 2010). With regard to BM novelty, the research team looked at the measures as proposed by Johnson et al. (2008), Zott and Amit (2007) and Taran et al. (2015), resulting in the use of a three-item scale. In line with Protogerou et al. (2012) and Drnevich and Kriauciunas (2011), the authors measured BM performance on a subjective two-item scale. The reason for this subjective assessment by managers is that due to heterogeneity within the sample across industries more objective measurements are often hard to compare. Moreover, seldom managers will provide objective often business-sensitive, data. Finally, BM value capture in relation to cost reductions was assessed using a two-item scale (Lindgardt et al., 2009). These two scales are shorter versions of the scales used by Latifi et al. (2021). Company size was measured by the number of employees. See the appendix for a detailed list of items. For each item, the score ranged on a seven-point scale from 1 totally disagree, to 7 totally agree. Prior to data collection, the research team conducted several in-depth interviews with academics who have been involved in BM innovation case studies and with managers, to understand the phenomenon at hand and pre-test and validate the measures. Next, the questionnaire was read out loud to check for proper understanding. The questionnaire was pretested both by the researchers as well as independently form the researchers by the involved research agency which collected the data via their CATI system. The questions were posed in the Spanish language and the questionnaire, as developed by an international team, was based on multiple iterations, pre-tested and used in collecting the data for the current paper. Most items were used in a panel study that was executed two individual years prior to the data collection for this paper. Questions and items used were translated and back-translated from English to Spanish. All steps helped clarify the questionnaire and the adaptation of the scales for the research.

The use of a single informant in data collection could be problematic, as common method bias could arise, which is why the research team used several statistic techniques to check for this type of bias. First, a confirmatory factor approach of the Harman one-factor test (Podsakoff & Organ, 1986) revealed the absence of a single construct accounting for all the variance in the constructs. Next, in a more detailed analysis, the common latent factor approach as suggested by Podsakoff, Mackenzie, Lee, and Podsakoff (2003), also confirmed the lack of this bias.

Once the different types of potential bias were assessed, confirmatory factor analysis was conducted for the firms with and without an enterprise resource planning system using Lisrel 8.8. The results of the four-factor model obtained for each of the subsamples (Table 1) provide very satisfactory results for the firms without ERP ($\chi 2$ (29) = 32.87 CFI = 0.98 NNFI = 0.97 RMSEA = 0.04) and firms with ERP ($\chi 2$ (29) = 50.23 CFI = 0.96 NNFI = 0.94 RMSEA = 0.08) (Table 1).

The convergent validity was confirmed, with the loadings of each of the items on their respective constructs being statistically significant ($p < .001$). Also, the same factor structure was established (Schmitt & Kuljanin, 2008), which is why the baseline measurement model can be used for the structural model of each of the groups. The approach to the psychometric properties of the scales was made by calculating the scale compose reliability (Bagozzi & Yi, 1988) and average variance extracted (Fornell & Larcker, 1981) of the measures. Each of these items was about the cut-off point of 0.60 and 0.50, respectively, as recommended in the literature.

Discriminant validity was also assessed through different tests. First, the authors confirmed that the confidence interval between the constructs did not include the value of 1 (Anderson & Gerbing, 1988). Next, it was confirmed that the square root of the AVE was above the correlations between constructs (Fornell & Larcker, 1981). Finally, an advanced technique called heterotrait-monotrait (HTMT) ratio was used to check for this type of bias. This procedure compares the average correlations between constructs with the geometric mean of the average correlations of items within the same constructs (Voorhees, Brady, Calantone, & Ramirez, 2016). The values should be below the cut-off point of 0.85, which was the case with our

Table 1
Confirmatory factor analysis.

	Firms without enterprise resource planning			Firms with enterprise resource planning		
	Loading	SCR/Alpha Cronbach	AVE	Loading	SCR/Alpha Cronbach	AVE
Business model experimentation						
bmexper1	0.75 (8.00)	0.82/0.81	0.60	0.64 (6.99)	0.85/0.84	0.66
bmexper2	0.82 (8.97)			0.92 (11.08		
bmexper3	0.74 (7.87)			0.85 (10.03)		
Business model novelty						
bmcomplex1	0.61 (6.20)	0.73/0.72	0.50	0.60 (6.99)	0.85/0.82	0.65
bmcomplex2	0.73 (7.61)			0.91 (11.08)		
bmcomplex3	0.71 (7.36)			0.88 (10.03)		
Business model performance						
bmperfor1	0.76 (6.79)	0.81/0.81	0.69	0.92 (9.61)	0.84/0.84	0.73
bmperfor2	0.89 7.60)			0.78 (8.02)		
Business model value capture related to reduced costs						
bmcost1	0.80 (7.15)	0.71/0.71	0.55	0.83 (8.42)	0.90/0.90	0.82
bmcost2	0.68 (6.27)			0.98 (9.88)		
Overall adjustment	$\chi2$ (29) = 32.87 CFI = 0.98 NNFI = 0.97 RMSEA = 0.04			$\chi2$ (29) = 50.23 CFI = 0.96 NNFI = 0.94 RMSEA = 0.08		

t-value in brackets.
SCR = Scale compose reliability, AVE = Average Variance Extracted.

data for firms without (Table 2) and with enterprise resource planning systems (Table 3).

Based on the different tests, we can confirm that our measures comply with convergent and discriminant validity requirements.

5. Results

Multi-group modelling (Stanko, Bohlmann, & Molina-Castillo, 2013) makes it possible to compare the firms with and without enterprise resource planning. This approach includes the following steps:

1) The sample is divided between both types of firms.
2) A model is estimated to constrain all structural parameters constrained to be equal across the two groups.
3) A model is estimated with all the paths allowed to vary between the two groups.
4) A chi-square ($\chi2$) difference test is calculated to check whether the model obtained in step 2 represents a significant improvement over the model obtained in step 3. If the chi-square difference with one degree of freedom ($\chi2(1)$) is significant, it means that a moderation effect was found between both groups. However, if chi-square difference with one degree of freedom ($\chi2(1)$) is non-significant it means that a moderation effect is not present.

The adjustment fit of the structural model was very satisfactory for the group without enterprise resource planning ($\chi2$ (30) = 33.38 CFI = 0.99 NNFI = 0.98 RMSEA = 0.05) and for the group with enterprise resource planning ($\chi2$ (30) = 58.40 CFI = 0.95 NNFI = 0.92 RMSEA = 0.08). As can be seen in Fig. 2, hypothesis H1 is confirmed ($\chi2(1)$ = 18.12***), with the direct path between BM experimentation and BM performance being significant (0.33, $p < .05$) for the firms without ERP, but not significant for the group with enterprise resource planning (0.07. ns), see Fig. 3. However, an unexpected result occurred between BM experimentation and BM value capture due to cost structure, as this direct path was not significant for the group without ERP (0.11, ns). Furthermore, the direct path for the groups with ERP was also not significant (0.12, ns). Therefore hypothesis H2 was not confirmed ($\chi2(1)$ = 1.79).

Downstream BM novelty shows interesting results and plays a central role in the models we tested. Hypothesis H3 was partly confirmed ($\chi2(1)$ = 5.03**), with the impact of BM experimentation in BM downstream novelty being slightly stronger for firms with enterprise resource planning (0.54, $p < .01$) than it was for the firms without enterprise resource planning (0.49, $p < .01$). A similar but more explicit result was found in the relationship between BM downstream novelty and BM performance, with the impact for firms with enterprise resource planning being significant (0.50, $p < .01$), while it is non-significant for those without enterprise resource planning (0.06, ns), which means that hypothesis H4 was also confirmed ($\chi2(1)$ = 6.69***).

The last hypothesis H5, finally, suggested a stronger positive effect of BM downstream novelty on BM value capture due to cost structure improvement for firms with ERP. However, it turned out that this path was significant for firms without enterprise resource planning (0.48, $p < .01$), and non-significant for those with enterprise resource

Table 2
Discriminant validity (AVE-Correlations and HTMT). Firms without enterprise resource planning.

AVE correlation comparison	SCR	AVE	1	2	3	4
1. Business model experimentation	0.82	0.60	0.77			
2. Business model novelty	0.73	0.50	0.48	0.71		
3. Business model performance	0.81	0.69	0.13	0.19	0.84	
4. Business model value capture related to reduced costs	0.71	0.55	0.12	0.43	0.01	0.74

SCR = Scale compose reliability, AVE = Average Variance Extracted
Elements in the main diagonal are the square root of the AVE
*Levels of significance: *** p < .01 ** < 0.05*

HTMT test	**1**	**2**	**3**	**4**
1. Business model experimentation				
2. Business model novelty	0.69			
3. Business model performance	0.36	0.44		
4. Business model value capture related to reduced costs	0.35	0.66	0.01	

Table 3
Discriminant validity (AVE-Correlations and HTMT). Firms with enterprise resource planning.

AVE correlation comparison	SCR	AVE	1	2	3	4
1. Business model experimentation	0.85	0.66	0.81			
2. Business model innovation novelty	0.85	0.65	0.44	0.81		
3. Business model performance	0.84	0.73	0.06	0.24	0.85	
4. Business model value capture related to reduced costs	0.90	0.82	0.09	0.06	0.18	0.90

SCR = Scale compose reliability, AVE = Average Variance Extracted
Elements in the main diagonal are the square root of the AVE
*Levels of significance: *** p < .01 ** < 0.05*

HTMT test	**1**	**2**	**3**	**4**
1. Business model experimentation				
2. Business model innovation novelty	0.67			
3. Business model performance	0.27	0.49		
4. Business model value capture related to reduced costs	0.29	0.25	0.44	

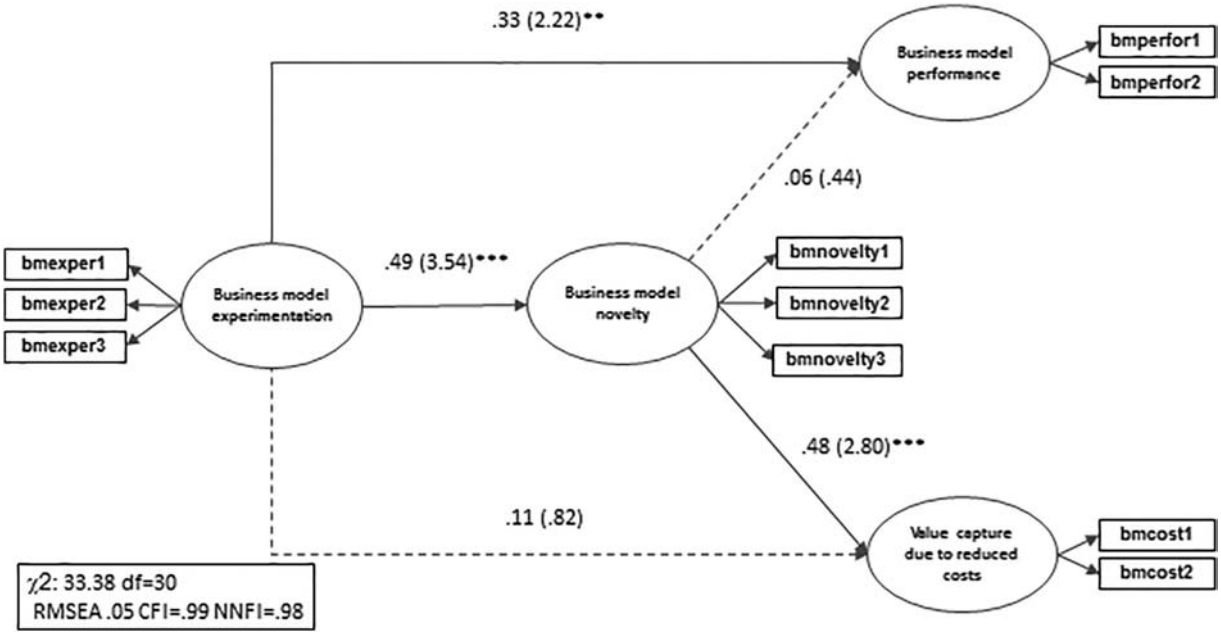

Fig. 2. Research model for firms without enterprise resource planning.

planning (0.21, ns). Apparently, the mediating role of downstream novelty is crucial in understanding the relationship between BM experimentation, BM performance and value capturing due to cost restructuring. Therefore, hypothesis H5 was not supported ($\chi 2(1) = 5.01^{**}$).

We adopted the approach suggested by Iacobucci, Saldanha, and DEng, X. (2007) to confirm the results of this mediation. According to this work, structural equation modelling (SME) allows a simultaneous analysis of direct and indirect effects, which is an improvement over other methodologies based on linear regressions. This type of analysis with SEM allows obtaining an overview of the direct, indirect and total effects. In addition, we compared our model against alternative models, as recommended by Anderson and Gerbing (1988). For instance, our proposed theoretical model was tested against another model containing the paths from BM cost structure to BM performance, and the results confirmed that the initial and tested theoretical proposed model outperforms the rival model. A detailed analysis of indirect and overall effects is addressed in the discussion section.

6. Discussion and implications

Making changes to a BM requires experimentation (Bojovic et al., 2018) involving the BM itself (Chesbrough, 2010), and companies look for the ideal configuration (Kuk & Janssen, 2013) of innovative BM components to allow them to achieve their business goals (Giesen et al., 2007). Although this trial and error process is sometimes misunderstood (Sosna et al., 2010), it is often crucial to experiment with the different components of a BM (Bojovic et al., 2018). Firms must be able to brainstorm, test (Zubac,

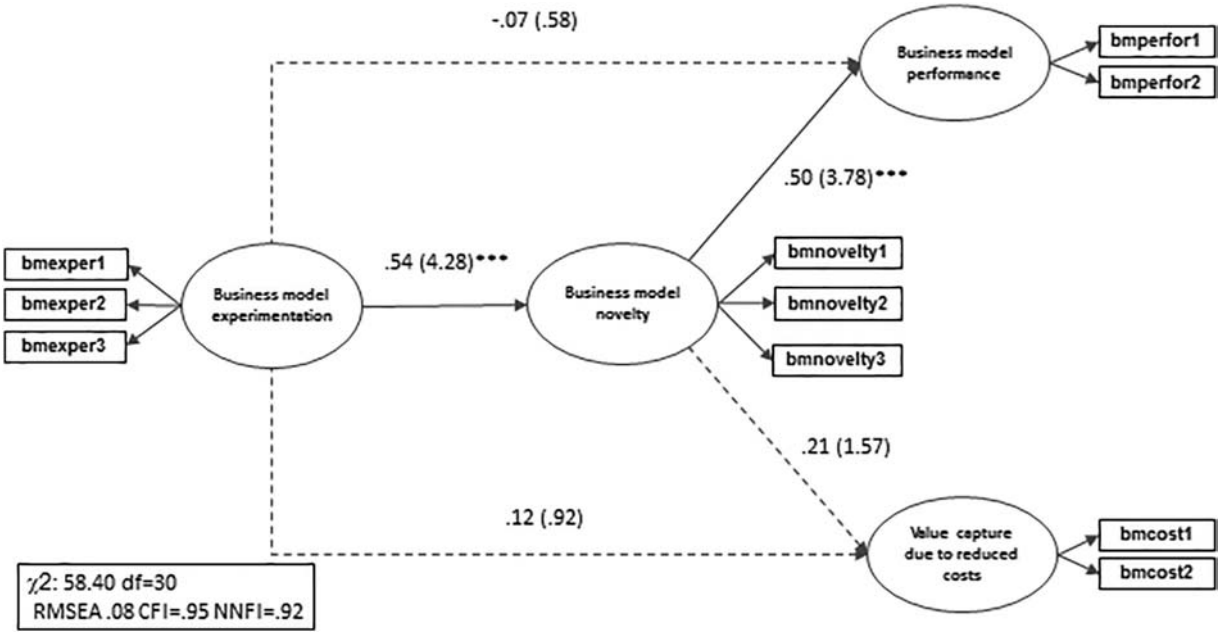

Fig. 3. Research model for firms with enterprise resource planning.

Table 4
Summary of hypotheses testing.

Hypotheses	Without ERP	With ERP	
H1: BM experimentation - > BM performance	0.33	ns	Confirmed $\chi 2$ (1) = 18.12***
H2: BM experimentation - > Value Capture reduced costs	ns	ns	Rejected $\chi 2$ (1) = 1.79 n.s.
H3: BM experimentation - > BM downstream Novelty	0.49	0.54	Partially confirmed $\chi 2$ (1) = 5.03**
H4: BM downstream Novelty - > BM performance	ns	0.50	Confirmed $\chi 2$ (1) = 6.69***
H5: BM downstream Novelty - > Value Capture reduced costs	0.48	ns	Opposite effect $\chi 2$ (1) = 5.01**

*Levels of significance: *** p < .01 ** < 0.05.*

2017), innovate and redesign their BM continuously, to try and reduce both risks and costs (Bouwman et al., 2020; Cosenz & Noto, 2018). The distinction between the BM innovation process and its outcome, the renewed or innovated BM, is crucial.

The aim of this paper is to test the theoretical model relating BM experimentation and innovation, primarily in the downstream components of ERP involving customers, i.e. CRM and other related downstream key activities, with two outcome variables, i.e. BM performance and the value being captured as a result of the renewed cost structure. As such, our research sheds light on the role of ERP software as either an impetus or an impediment, by drawing a distinction between increased performance, value capturing in relation to cost restructuring (see Table 4).

The results of structural equation modelling fully or partially support most of the hypotheses, as expected. The findings show the importance of BM experimentation as a driving force for BM performance, either directly (firms without ERP) or mediated by downstream novelty (firms with ERP). Recent research also highlights the critical role of BM experimentation and learning as part of the BM innovation process (Berends et al., 2016; Bojovic et al., 2018; Sosna et al., 2010), for instance in reducing uncertainty and obtaining a competitive advantage when reformulating existing BM (Cosenz & Noto, 2018). As such, our study provides new evidence regarding the importance of BM experimentation in the re-design of innovative and profitable BMs (Molina et al., 2022). Although a certain level of linearity is assumed, recent research has proposed that the relationship between BMI, value capturing and performance is not linear, but quite complex, due to the dependence on contingencies (Ibarra, Bigdeli, Igartua, & Ganzarain, 2020), as well as the question as to what the core components are in the BM innovation process (Heikkilä et al., 2018). In this paper, we decided to focus on BM components that can be managed by the SME owner or the entrepreneur, i.e. those that involved downstream activities related to their customers.

A distinctive contribution of this research is the comparison between firms with ERP systems and without ERP technologies in place. Several links in the theoretical model are significantly different, depending on the type of firm under study. As expected, the effect of BM experimentation on BM performance is direct in firms without ERP systems, and indirect (through downstream BM novelty) in companies with ERP technologies. Companies without ERP do not have to think about having to adapt their ERP software or changes in the way they use CRM in approaching their customers as a result of the BM experimentation. These firms are less constrained and repeat benefits, sales and profit growth more easily, confirming earlier case study results of Heikkila et al. (2018). Apparently, they have greater freedom than companies that are constrained by ERP in terms of their ability to experiment with their BM. They may need to find an informal or alternative approach to do so (Dechow & Mouritsen, 2005). It would appear that firms with ERP only reap performance benefits when downstream BM novelty is realized, which may indicate that ERP encourages BM innovation. In other words, if firms engage in downstream innovation, CRM applications can contribute only when they are included in the innovation. Potential value related to cost savings may already have been captured when the ERP software was implemented, and a further increase in profits and sales may be the core focus. The result does not imply, then, that ERP implementation has a negative effect on BM experimentation in relation to the outcome in terms of improved performance. The results indicate that companies that have an ERP first need to adapt that ERP to the novelty of the BM to improve BM performance, which is consistent with the findings of Björkdahl and Holmen (2013). With regard to BM experimentation, companies without ERP show direct results in their performance, although it is striking that it is only when downstream BM components are considered that there is no intermediating role with regard to firm performance, even though the value is captured due to cost savings, which would appear to suggest that benefits related to downstream novelty are mainly limited to cost savings. Perhaps that means that, for SMEs with ERP, any cost-related benefits have already been realized, while SMEs that implement ERP later may first start to think about their customer-related processes when they begin considering downstream BM novelty and, as such, are able to capture value at that point due to cost savings. Apart from Rodríguez et al. (2020a, 2020b), this is, to our knowledge, one of the first quantitative studies focusing on the moderating role of ERP software suites with regard to BM experimentation and performance, and a firm's ability to capture value, practitioners and researchers alike are urged to consider the implications and make decisions accordingly. One could speculate that the effect of implementing ERP removed all the potential benefits related to value capturing and that the potential value being captured is marginal, while it may be easier to boost sales and profit. We are aware that we treat ERP as a black box and that we could have focussed more precisely on the different modules being used, which modules were used, or whether or not complete solutions were implemented. We could also have taken a closer look at the technical implementation, of a vendor, cloud-based and/or self-developed solutions, as well as the level of customization.

Moreover, our findings show that BM experimentation increases downstream BM novelty. A BM is refined and adjusted through BM experimentation (Cortimiglia, Ghezzi, & German, 2016). Firms may modify various BM components, thus increasing BM novelty (Snihur & Tarzijan, 2018). Managing BM novelty poses a challenge because it involves having to make a variety of decisions (Ghezzi & Cavallo, 2020). Our findings, along with other recent studies (Bouwman et al., 2018, 2019), suggest that managers in charge of innovating BM are faced with a potential trade-off between the maturity of their IT, in terms of the implementation of ERP, BM novelty, performance and value capture. From a practical perspective, it, therefore, makes sense to include persons responsible for IT and downstream operations within SMEs at an early stage of BM experimentation because ERP can be an impediment and quite costly. If ERP is a part of BM Innovation in companies that don't have an ERP system yet, the benefits are clear, and implementing ERP can be an impetus.

In academic terms, our results contribute to research into the mediating role of BM novelty in the connection between BM experimentation and BM performance (for firms with ERP) and BM cost structure (for firms without ERP). To the best of our knowledge, this is the first study focusing on those variables and examining their mutual influence.

Having said that, there were some unexpected and non-significant findings. Specifically, H2, linking BM experimentation and BM cost structure, is not significant in any of the subsamples. Although BM experimentation may imply direct high costs in practice or the need for future investments (Cosenz & Noto, 2018), our results suggest that these costs have no significant impact on BM cost structure. When the results of BM experimentation are positive, meaning that the new BM performs well, firms usually commit resources to the modified BM (Björkdahl & Holmen, 2013), and an effect on BM cost structure is to be expected, but that does not appear to happen in practice. That may be because BM experimentation involves in particular the value proposition dimension of the firm's BM and to a lesser extent

the value appropriation dimension (Cortimiglia et al., 2016), which means it does not affect the BM cost structure. Indeed, experimenting and testing costs are challenging for SMEs and have recently been identified as the main barrier to BM innovation (Ghezzi & Cavallo, 2020). Further research is needed to test H2 in more detail, while a more longitudinal research design may provide a more nuanced insight.

Finally, the impact of BM novelty on BM cost structure is only significant in firms without ERP systems, which means that H5 as proposed, is not supported, but the effect is inverse. H5 posited a stronger positive impact of BM novelty on BM value capturing for firms with ERP, but results show the stronger effect is for companies without ERP. Earlier studies suggest that leveraging low-cost technologies can reduce costs (Chesbrough, 2010). Implementing ERP systems is expensive, although, with SaaS models, the initial ERP implementation cost has been reduced considerably, for example requiring almost no infrastructure on the part of the firm implementing the ERP and firms view the ERP-related costs as a lease rather than an investment. The unexpected results for H2 and H5 suggest that BM cost structure, as a dependent variable, merits further research, which is also true with regard to some other driving forces that were not included in this study, like cooperation with key partners (Achtenhagen et al., 2013) or changes in revenue streams (Kranz et al., 2016), which may explain modifications to BM cost structure within firms.

We realize that our focus on Spanish SMEs engaged in BM experimentation and innovation has some consequences for the external validity of our findings regarding the SMEs in other industrial-economic systems and in other cultures. Moreover, the generalization of our results towards large enterprises is an issue, although SMEs are core contributors to value generation in most western and developing economies. Since SMEs are relatively flexible, the adoption and implementation of ERP are often less complex, and managing changes is often easier in SMEs, so we can expect our findings to be different when involving large enterprises, which are often more constrained after adopting and implementing ERP, and more focused on value capturing by looking at downstream BM novelty. As we discussed before this might not per se lead to improved performance.

7. Limitations and future research

This study also has a number of limitations that need to be acknowledged. First, using cross-sectional data, rather than longitudinal data, limits the discussion about the causality of the proposed relationships. Alternative models with inversed causality have shown a lesser fit with the data. Undoubtedly, including other moderators, antecedents, mediating variables and consequences in our model could offer an appealing potential contribution to the field of integrating enterprise resource planning and BM innovation. Focusing on different levels of IT maturity may further nuance our findings. Further research into the relationship between business logic in creating and capturing value, and the role of information technology in support of the operational model of a firm may yield new and interesting insights (see Verhagen et al., 2022).

Finally, there are some interesting avenues for future research building on the findings of this study. Surprisingly, studies involving business model innovation often ignore contextual factors. It would be interesting to consider industry-specific factors that could provide interesting business recommendations. We, therefore, suggest that future work in this field should take these contextual conditions into account. Similarly, other factors such as the differences between family and non-family firms (Chrisman, Chua, De Massis, Frattini, & Wright, 2015), the environmental dynamics or the effect of a firm's age on the connection between BM and firm performance (Pati et al., 2018) could enrich the results. In addition, it would be worthwhile to examine how other BM innovation factors (Weking et al., 2018), such as the use of BM tools in BM experimentation (Bouwman et al., 2020; Szopinski et al., 2020) affect the results of this study and what light they could shed on existing BM innovation literature (Foss & Saebi, 2018). Also, it could be interesting to differentiate between traditional ERP implementation (located on company servers), which is what most companies using ERP software have currently opted for in comparison to cloud-based ERP implementations (which would affect BM costs in a positive way). Finally, more detailed research on which ERP modules may enable or obstruct BM Innovation and more direct relation with BM components would also provide a valuable research contribution.

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Declaration of Competing Interest

None.

Appendix

Business model experimentation *(Sosna et al., 2010; Taran et al., 2015; Teece, 2010).*

During last year, your enterprise:

- bmexper1: Experimented with the implementation of their business model.
- bmexper2: Had a specific team to manage business model changes.
- bmexper3: Allocated budgets for business model experimentation.

Business model downstream novelty *(Johnson et al., 2008; Pucci et al., 2017; Zott & Amit, 2008).*

During last year, your enterprise made changes in your business model that:

- bmcomplex1: Have never been implemented by competitors before.
- bmcomplex2: Introduced new ways to transact with customers.
- bmcomplex3: Introduced new ways of organizing relations with customers.

Business model performance *(Protogerou et al., 2012).*

During last year, your enterprise made changes in your business model that make us satisfied with:

- bmperfor1: The sales growth of the enterprise.
- bmperfor2: The profit growth of the enterprise.

BM value capture related to reduced costs *(Lindgardt et al., 2009).*

During last year, your enterprise made changes in your business model that:

- bmcost1: Introduced new ways to reduce fixed costs.
- bmcost2: Introduced new ways to reduce variable costs.

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