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Gender differences and business model experimentation in European SMEs

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Abstract

Purpose – By drawing on various theoretical approaches and a gender perspective, this paper aims to examine business model (BM) experimentation as a step towards BM experimentation capabilities as an outcome and, as such, a key antecedent to firm performance.

Design/methodology/approach – In this paper, using a unique data set of 444 European small and medium-sized enterprises (SMEs), the authors draw on various theoretical perspectives to devise a structural equation model that examines BM experimentation as a step towards business model innovation (BMI) as an outcome and, as such, a key antecedent to firm performance. Potential differences are examined between female-owned and non-female-owned businesses with regard to hypothesized relations.

Findings – Multi-group analysis results reveal that drivers of BM experimentation and the paths linking BM experimentation to overall firm performance are different for female owners in comparison to male owners.

Research limitations/implications – Theoretical and practical implications are various. For SME entrepreneurs, experimenting with their BMs does lead to improved performance.

Practical implications – Theoretical and practical implications are various. For SME entrepreneurs, experimenting with their BMs does lead to improved performance.

Originality/value – Despite the increasing number of papers focussing on the relationship between BM and firm performance, the focus on female entrepreneurship, gender differences and BMI, more specifically the process of BMI as BM experimentation, is relatively rare.

Keywords Gender, Innovation, Business development, Small to medium-sized enterprises, Business model experimentation, Business model innovation, Entrepreneurship, Female entrepreneurs, Small and medium-sized enterprises (SMEs)

Paper type Research paper

1. Introduction

In the past two decades, attention to the business model (BM), defined as the business logic of a firm to create and capture value (Teece, 2010; Zott *et al.*, 2011), has increased in line with the current turbulent economic environment (Martín-Peña *et al.*, 2018). Diverse external and internal factors such as changing regulation, emerging technologies, competitor behaviour, need for changing capabilities or privatization amongst others have led to BMs becoming obsolete (Bowyer and Chapman, 2014). As a consequence, academics and managers have focussed on business model innovation (BMI), seen as changes in a firm's BM components and/or their linking architecture (Foss and Saebi, 2017). To achieve innovative BMs, firms have engaged in the process of experimenting with alternative BMs (Chesbrough, 2010), either as thought experiments based on paper-and-pencil exercises or as real small-scale tryouts. Recent research suggests that firms must be able to experiment as part of a learning strategy (Berends *et al.*, 2016) to innovate their BM if they aim for a growing, profitable and sustainable business performance (Huang *et al.*, 2014; Heikkilä *et al.*, 2018). In our approach, we make a distinction between BMI as a process (Foss and Saebi, 2017; Demil and Lecocq, 2010), labelled as BM experimentation and BMI as an outcome (Amit and Zott, 2012). Our interest is in the former

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rather than the latter, and in BM experimentation in small and medium-sized enterprises (SMEs), specifically, the way in which gender differences play out.

In many countries, SMEs are the driving force behind the economy, *de facto* using the most people (Muller *et al.*, 2017). Previous work suggests that SMEs face specific challenges when engaging in BMI and have less resources and capabilities to engage in BM experimentation than large firms (Pucci *et al.*, 2017). Surprisingly, attention to BMI and experimentation *per se* has been limited and mainly case-based (Dmitriev *et al.*, 2014; Sosna *et al.*, 2010). In general, references to the SME domain are scarce, specifically when discussing female-owned firms. Traditionally, start-ups and mature SMEs are led by male owners or managers. However, the importance of female-led SMEs is growing (Akter *et al.*, 2019), the number of new start-ups created by women is increasing and women play a key role in family businesses (Meroño-Cerdán and López-Nicolás, 2017). Despite more women (52 per cent) than men live in Europe (European Commission, 2017), recent statistics show only 34 per cent of women are self-employed and only 30 per cent of European start-ups are owned or managed by women (Eurostat, 2016). Moreover, fewer mature companies are run by women in comparison to men (Minniti, 2017). Gender inequality is diminishing but still reflects in some aspects of life, such as the division of household labour and income (Brush *et al.*, 2009), entrepreneurship (Haus *et al.*, 2013), CEO compensation (Xiao *et al.*, 2013) or access to top management positions (Hoobler *et al.*, 2018). Entrepreneurship is a gendered phenomenon because of differences in motivations, intentions and issues that face female entrepreneurs (BarNir *et al.*, 2011), while women in leadership (CEO or senior management positions) lag behind men because of diverse factors (Hurley and Choudhary, 2016). Feminist theory applied to organization studies has revealed that there is a clear difference between men and women in venture creation either because of overt discrimination or systemic factors (Grosser and Moon, 2019). Moreover, entrepreneurial ecosystem factors are gendered and may divest women from vital resources like education or network support (Sperber and Linder, 2018). In addition, because of gender discrimination, in some countries, female CEOs are likely to have lower social capital, which, in turn, may lead to higher agency costs and lower firm performance for women appointed as CEOs (Jadiyappa *et al.*, 2019).

Notwithstanding that the focus of our paper is on the interplay between BM experimentation, its antecedents and overall firm performance, our main contribution focus on gender to seize the opportunity to explore the difference between female-owned and male-owned businesses. In particular, drawing on feminist theory in organizational studies, as shortly introduced before, and BM literature, we aim to investigate differences between female-owned and non-female-owned businesses in terms of BM experimentation, drivers and overall firm performance, as well as the paths linking these constructs mediated by capabilities related to BM experimentation.

The results of this research contribute, with gender as an important factor, to entrepreneurship and BM literature by providing new and important insights into the interdependencies and interrelationships among antecedents of BM experimentation and overall firm performance. To provide such insights, we devised a theory-based structural equation model and conducted a survey-based study on 444 European SMEs, evaluating the validity of the path relationships in the proposed model for the overall sample, as well as on two subsamples: male-owned companies and female-owned companies. Our second contribution relates to the emphasis on BM experimentation as preceding the effectuation of BMI. Prior research focussed on BMI as an outcome only (Huang *et al.*, 2014). In qualitative research, we have seen that the process of BMI – for example, BM experimentation – can be characterized by trial and error processes, continuous discussions while making use of different ontologies and tools, and experimentation with specific BM components such as the core value proposition, often leading to a "starting all over again" stage (Heikkilä *et al.*, 2018). Therefore, we focus on the experimentation phase that precedes BMI as an outcome, and the capabilities needed. In addition, our third contribution is that we explore how both internal and external drivers of BM experimentation work out differently for male- and female-led SMEs. Recent research conceptualizes the effects of both types of drivers of BMI without empirical support (Foss and Saebi, 2017) or studies just one, often technology-related, driving factor like digitalization (Bouwman *et al.*, 2018; Mattsson and Andersson, 2019) forcing a firm to modify its BM (Müller *et al.*, 2018). Next, our fourth contribution is that, while BM and BMI literature traditionally focus on large firms (Bowyer and Chapman, 2014), our study analyses BMI influences in the context of SMEs. Besides its academic focus, this research addresses some business stakeholders' and policymakers' concerns, such as how to encourage both men and women to start a business venture, to achieve top management positions and to innovate in their existing businesses.

To frame the results, we will provide a review of background literature on gender theory and of empirical cross-sectional research on BMI. We do not aim to provide an overview of BMs and BMI, as this has been done by others before (Morris *et al.*, 2005; Wirtz *et al.*, 2016; Zott *et al.*, 2011). In what follows, we will present our research approach and discuss its results and limitations.

2. Literature review

There are two main streams of literature we built on. We will first discuss the entrepreneurship and gender literature and then briefly discuss some insights from BMI literature before introducing our proposed conceptual model.

2.1 Gender theory

The first distinction between sex (biological differences between men and women) and gender (the socially and culturally aspects of the masculine and feminine) was introduced in the 1970s. Challenged by multiple international researchers coming from diverse disciplines, gender theory has evolved over the years from a gender essentialism approach to the social shaping of gender and, more recently, to a gender theorizing expressed in gender intersectionality, diversity and minority gender theories. This historical evolution of gender research, summarized very briefly here, is observed in specific academic fields of management research such as business

creation (Bird and Brush, 2002), entrepreneurial leadership (Harrison *et al.*, 2015), management information systems (Trauth, 2013) and innovation studies (Nählinder *et al.*, 2015).

Interest in female entrepreneurship has been growing for more than 30 years now. Furthermore, in the past decade, we have witnessed tremendous growth in attention to both practice and research. Although male entrepreneurs still outnumber female ones, there has been a rapid growth in research on female entrepreneurship over the past decade. In fact, more than 50 per cent of all entrepreneurship journal articles published since 2009 are devoted to study entrepreneurship with a focus on gender (Link and Strong, 2016). However, there is a scarcity of research focussing on innovation and gender studies. We contend that the reason behind this issue is a biased approach used by innovation researchers (mainly men) that use male-based conceptualizations and operationalizations of the "innovation" construct, focussing on gender-labelled sectors and with a masculine definition of "innovator" (Nählinder *et al.*, 2015). A similar bias exists in entrepreneurial leadership research, where most frameworks have been developed by men and based on male-normed assumptions (Harrison *et al.*, 2015).

Women have been discriminated against in many aspects of life. Gender inequality has been reported in entrepreneurship research with regard to start-up survival (Minniti, 2017), CEO compensation (Xiao *et al.*, 2013) and access to top management positions (Hoobler *et al.*, 2018). That discrimination correlates with lower opportunities to gain education and experience in management (Jadiyappa *et al.*, 2019). Literature reveals that the image and beliefs about entrepreneurs (Gupta *et al.*, 2009) and managers (Ryan *et al.*, 2016) are typically male/masculine, resulting in characteristics associating entrepreneurial and leadership behaviour with men. Moreover, Kelley *et al.* (2017) showed that women often pursue different organizational and economic objectives and they have different motivations (e.g. necessity vs opportunity) and intentions to create a new business. Additionally, female CEOs differ from male CEOs because of gendered behaviours (Palvia *et al.*, 2015) – female managers are seen as more risk-averse and long-term focussed (Simerly and Gan, 2017), as well as capable of influencing their firms' organizational innovation (Torchia *et al.*, 2011) and building more innovative companies (Herring, 2009).

Drawing on institutional theory, Brush *et al.* (2009) studied female entrepreneurship. Leung (2011) proposed and tested a conceptual framework to understand female entrepreneurship and gender role identity. In their review of entrepreneurial leadership literature, Harrison *et al.* (2015) proposed a gendered analysis and research agenda drawing on role-congruity theory. Recent gender theory has evolved towards diversity awareness with a special focus on minorities, masculine identity and feminist approaches.

Drawing on the idea that organizations are socially embedded and essentially gendered, Ross-Smith and Huppatz (2010) and Eriksson-Zetterquist and Styhre (2008) adopted the feminist theory in studying women in top management positions. In this paper, we draw on the latter theoretical framework and consider gender as a socially built concept and organizations as socially embedded institutions where individuals relate multi-laterally. A minority gender framework, specifically the feminist approach, theorizes how situated knowledge and lived experiences of female managers shape their distinct behaviour in comparison to male managers. Drawing on prior feminist studies on entrepreneurship (Eriksson-Zetterquist and Styhre, 2008; Ross-Smith and Huppatz, 2010) and a gender-aware conceptualization of innovation (Nählinder *et al.*, 2015), it seems that women in management positions, entrepreneurship and innovation are seen as marginalized individuals and seldom seen as managers or innovators. Indeed, female CEOs are the reflection of a minority in organizations, with specific behaviours with regard to innovation and management.

Reasons for men and women to move into entrepreneurship (Xavier *et al.*, 2012) and out of it (Justo *et al.*, 2015) have been found to be different. Female entrepreneurs face many challenges regarding the start and viability of a business. For instance, differences in access to capital have been identified as an obstacle for women to launch a small business (Neeley and van Auken, 2010). Differences have been also observed in how women and men achieve their goals in venture creation, in starting a business with opportunity identification and in deploying strategies (DeTienne and Chandler, 2007; Harrison *et al.*, 2015). Recent studies have found that the most salient barriers for women to become entrepreneurs are high initial investment and poor entrepreneurship knowledge, while motherhood and female entrepreneurial norms (defined as the level of acceptance and admiration of women's entrepreneurship held by members of a society) have been found to be irrelevant (Wu *et al.*, 2019). Often, women entrepreneurs gain sufficient knowledge from social networks and adequate preparation before starting their businesses (Sharafizad and Coetzer, 2017). Nevertheless, fewer start-ups created by women survive and reach a mature stage in comparison to their male counterparts (Minniti, 2017). In terms of female access to top management positions, growing numbers of female CEOs perceive lower or no difference and discrimination due to gender, especially in meritocratic organizations (Soklaridis *et al.*, 2017) and family firms (Meroño-Cerdán and López-Nicolás, 2017).

Not surprisingly, research results with respect to gender differences are inconclusive. Older studies found that female-owned businesses underperform financially (Chell and Baines, 1998). That finding has, however, been challenged and reevaluated by recent studies (Justo *et al.*, 2015). For example, in a study by Robb and Watson (2012), no significant gender differences were found in terms of financial performance. Also, Coleman and Kariv (2013) did not find any gender differences in financial strategies between female-owned and male-owned businesses. There has been observed a negative impact of the appointment of a female CEO on diverse performance measures due to an increase in agency costs, which has been quantified by Jadiyappa *et al.* (2019). Female entrepreneurship and management are important because female entrepreneurs and leaders are role models for younger female generations and can encourage them to pursue an entrepreneurship career or a top management position, and thus, to become a source of economic growth (Díaz-García and Byrne, 2017).

Regarding gender differences in innovation, prior findings are inconsistent as well. Women are traditionally excluded from technological innovation networks (Berger *et al.*, 2015), often

seen as users or receivers of innovations instead of possible innovators or hardly identified as inventors or as working in innovative industries. Nevertheless, when male-labelled sectors are excluded and female-labelled industries are studied, no differences in product innovation and process innovation are found between men and women (Nählinder *et al.*, 2015). In addition, it has been found that female managers can influence organizational innovation if a consistent female minority (at least three women) can make decisions in the board of directors (Torchia *et al.*, 2011). Based on this brief review and building on feminist gender theory, we posit that there are significant gender differences in entrepreneurship and management, and we aim to investigate gender differences with a specific focus on BM experimentation and overall firm performance. We now shortly discuss the essentials of BM literature to position our research.

2.2 Business model innovation and experimentation

The relationships between BMI and strategic issues such as value creation and firm performance have received increasing attention over the past decades (Casadesus-Masanell and Ricart, 2010; Teece, 2010; Wirtz *et al.*, 2016). We define BMI as a change in a company's business logic of value creation, distribution and capturing that results in observable changes in its practices towards customers and partners (Zott and Amit, 2008), that is, BMI as an outcome. While some scholars view BMI as a discrete outcome (Amit and Zott, 2012), we view it as a process of strategic transformation (Foss and Saebi, 2017; Demil and Lecocq, 2010). Such process-oriented approach assumes that BMs are subject to continuous refinement and modification (Demil and Lecocq, 2010). Our process-oriented view is suitable given that our research objective focusses on the antecedents of BM experimentation, for which refinement and modification are instrumental.

BM experimentation is a complex process that requires iterations and evolution (Heikkilä *et al.*, 2018). BM experimentation is one of the antecedents of BMI as an outcome and needed "when it is clear that the old BM is no longer working, BM experimentation becomes so important" (Chesbrough, 2010, p. 357). In this paper, we define BM experimentation as a company's activities and engagement in experimenting with new models based on reconfiguration of BM components or architecture. We pay special attention to the capabilities and resources needed for BM experimentation.

Although strategic decisions are often seen as crucial (Al-Debei and Avison, 2010), there are still many uncertainties about the drivers motivating BM experimentation. For example, in an entrepreneurship context, Morris *et al.* (2005, p. 276) state that "despite the presence of business and financial opportunities and novel business ideas, companies fail to capture value and make profits". Undoubtedly, there are still many uncertainties regarding the antecedents and consequences of BM experimentation. In this research, we focus on external and internal drivers as the antecedents of BM experimentation besides the already mentioned attention to the capabilities needed for BM experimentation. In the following section, we propose several hypotheses to derive the antecedents of BM experimentation and the implications for firm performance and capabilities.

3. Conceptual model and hypotheses

In general, it is assumed that firms' BMs play an important role in their ability to achieve sustainable competitive advantage and improved financial performance (Casadesus-Masanell and Ricart, 2010; Cucculelli and Bettinelli, 2015); thus, like Brettel *et al.* (2012), we consider overall firm performance as the outcome variable in our model. Many studies suggest that there is a direct relation between BMI as an outcome and firm performance (Cucculelli and Bettinelli, 2015; Zott and Amit, 2008). Sustainable competitive advantage and improved financial performance may not be achieved if a firm is not able to innovate and/or dynamically change its existing model driving the business in response to changes in technology, regulation or market (Chesbrough, 2010; De Reuver *et al.*, 2009). Through BMI, firms can redefine both their value proposition and their core business logic (Bouwman *et al.*, 2008; Foss and Saebi, 2017). Companies are engaged in continuous and often radical improvements in products, services and service (un)bundling affecting their value proposition, in marketing approaches while integrating new technological solutions such as big data solutions and digital channels, in business processes related to changes in the ecosystem or in the definition of financial arrangements such as revenue models or pricing strategies. Companies might, as a consequence of these four often interrelated changes, also need to change their BMs (Bouwman *et al.*, 2008; Chesbrough, 2010) to boost their performance, for instance, to increase profit, to realize growth (Heikkilä *et al.*, 2018) or to improve their capacity to innovate, capitalize on new innovations or meet market demands through radical and disruptive innovations (Johnson *et al.*, 2008).

3.1 Internal and external drivers of business model experimentation

With regard to the antecedents of BM experimentation, we focus on both internal and external drivers (Cortimiglia *et al.*, 2016). Foss and Saebi (2017) pointed out the relevance of external drivers such as changes in technologies, regulation, market and competitor behaviour in relation to BM innovation/dynamics (Jaworski and Kohli, 1993), while also acknowledging the role of internal drivers such as strategic orientation and management attention to existing innovation activities. Internal drivers of BM experimentation may be similar to those of innovation activities in general, such as research and development (R&D) product innovation activities or marketing innovation activities (Mina *et al.*, 2014).

A common internal driver influencing BMI is product/service innovation (Lambert and Davidson, 2013). As the value proposition of a BM is heavily influenced by the products and services offered, product innovations can lead to BMIs (Bucherer *et al.*, 2012). Specifically, Bohnsack *et al.* (2014) showed several cases in which internal innovations in a firm's product content and development, as well as forms of marketing innovation such as new retailing channels or new pricing strategies, affect value proposition and value network and, in turn, BMI. Another internal driver is strategy (Foss and Saebi, 2017), affecting the business logic and business processes, as well as the supporting enterprise architectures (Al-Debei and Avison, 2010). Leaving aside the exact nature of

the relationship between strategy and BM, the fact is that the two are related (Cortimiglia *et al.*, 2016), and firms that engage more in strategy discussions are more likely to experiment and change their BMs.

Female entrepreneurs are usually seen as less innovative (Nählinder *et al.*, 2015) and as pursuing specialized business strategies, aiming at continuity rather than growth and focussing on loyalty of key employees and customers (Verheul *et al.*, 2002). In this context, changes in strategy and the introduction of innovations as two internal drivers, are expected to affect some components of BM experimentation differently due to gender. Recently, Neergaard and Christensen (2017) identified two alternative interpretations of BMI by female entrepreneurs. One explanation focusses on women developing a BM to successfully sell what customers want. The alternative explanation is that female entrepreneurs turn their own personal approach into a BM and brand their product through a very personalized strategy. These insights illustrate that BM experimentation in the case of female entrepreneurs may be differently driven. Thus, we posit that,

H1. The positive impact of internal drivers on BM experimentation will be different for female-owned and non-female-owned businesses.

Companies often change their BMs in response to changes in their environment (Foss and Saebi, 2017; Bohnsack *et al.*, 2014). Generally speaking, innovation is assumed to be driven by competitive behaviour (Johnson *et al.*, 2008). Competitive, high-technology environments as external drivers, induce companies to modify their BMs (Eagly and Karau, 2002). In fact, several studies have confirmed that competitive pressure is relevant to BMI (Mina *et al.*, 2014). Moreover, gender stereotypes theory states that male entrepreneurship is competition-focussed, while female leaders prefer cooperation rather than competition (Eagly and Karau, 2002). However, firms owned and managed by women tend to be in sectors where competitive intensity is high (Orser, 2017). Thus, although female entrepreneurs may prefer cooperation, the competitive environment might force them to act differently.

Also, new technologies have been mentioned as external drivers of BMI (Foss and Saebi, 2017). Companies operating in environments with high technological turbulence are often forced to innovate to respond to turbulent changes in technology. SMEs have to assess whether and how emerging technologies can potentially support or affect their BM. Thus, rapidly emerging technologies such as the internet-of-things (IoT), new applications such as blockchain, big data (analytics) or social media platforms will lead to experimenting with new BMs. However, women have been seen as less technology-oriented and sometimes even as technology-averse. Therefore, many countries and public agencies have designed technology training programmes specifically for female entrepreneurs (Orser, 2017). In addition, most female-owned firms are in service sectors such as retailing, while high-tech companies are usually male-owned (Robb and Watson, 2012). These issues may affect women's perceptions of external drivers (e.g. technological turbulence and competitive pressure) to experiment with new BMs, compared with male-owned businesses. Therefore, we hypothesize that,

H2. The positive impact of external drivers on BM experimentation will be different for female-owned and non-female owned businesses.

An important phase before the effectuation of BMI is the phase in which firms experiment with changing their business logic, adjusting individual or related BM components or even the basic BM architecture. BM experimentation can be done in many different ways, ranging from thought experiment through brainstorming while using BM ontologies such as CANVAS (Osterwalder and Pigneur, 2010) or service, technology, organization and finance (Bouwman *et al.*, 2008), specific tools such as BM stress-testing (Haaker *et al.*, 2017), BM road-mapping (De Reuver *et al.*, 2013), BM patterns (Remané *et al.*, 2019) or more generic tools like SWOT analysis related to desired changes, to actual "field" experiments in trial markets. However, as feminist theory on innovation suggests, as discussed before, there are clear differences in the way women make use of their resources and capabilities when engaged in innovation and the pursuit of outcomes, compared to their male counterparts. As such, we expect that these differences are also relevant when discussing BM experimentation, therefore, we posit that,

H3. The positive impact of BM experimentation on overall firm performance will be different for female-owned and non-female-owned businesses.

In the experimentation phase, specific innovation capabilities of the firm are required, which we label as BM experimentation capabilities. While capability literature focusses on the capacity of a firm to deploy its assets, to organize, combine and reconfigure them (Pucci *et al.*, 2017), BM experimentation capabilities refer to the capabilities of a firm to deal with continuous innovations (Teece, 2017). Our interest in capabilities relates to what Teece labels as "high order capabilities", focussed on sensing, seizing and transforming competencies needed to design, implement or innovate BMs. Implementing multiple new ideas requires constant involvement, perseverance, multi-tasking and engagement. Companies with strong dynamic capabilities will be able to turn experiments with their BM into real changes.

However, the degree of engagement in BM experimentation might differ depending on the gender of the owner/manager, their focus, experience, qualification and leadership skills, as argued before. For instance, with regard to innovation capacity, DeTienne and Chandler (2007) found that women are more likely to be involved in a learning–innovating sequence to identify opportunities than men. Moreover, Herring (2009) posited that female managers enable their companies to be more flexible and innovative, and influence their firms' organizational innovation, often an important aspect of business logic change (Torchia *et al.*, 2011). In addition, women have been found more likely to be involved in a learning–innovating sequence to identify opportunities than men (DeTienne and Chandler, 2007). Therefore, women's BM experimentation capacity and actual BM experimentation may have a distinct impact on firm performance in comparison to those of their male counterparts.

H4. The positive impact of BM experimentation on BM experimentation capabilities will be different for female-owned and non-female-owned businesses.

H5. The positive impact of BM experimentation capabilities on overall firm performance will be different for female-owned and non-female-owned businesses.

The literature review and theoretical discussion lead to the model summarized in Figure 1.

4. Research method

4.1 Data collection

Data were collected in 2018 by a professional research agency based in the Netherlands. This agency has extensive experience in data collection in multiple countries. They use native speakers and computer-assisted telephone inquiry. The European countries included in the study are spread across all European regions (North, West, Central, South and East). For each region, the largest and the smallest countries with the highest number of SMEs were included. Quota for micro, small and medium enterprises was established as 33 per cent each. There was no quota defined for industry sectors and agriculture, public administration and household non-market activities were excluded. The sample was based on Dun and Bradstreet database. Dun and Bradstreet collects data on companies, their executives, industry classifications and contact information on a regular basis from chambers of commerce and other organizations. Companies were randomly selected and key respondents (owner or BMI manager) were interviewed. Identification data were not known to the researchers. Our data set comprised 444 European SMEs, of which 208 firms had a male owner and 236 had a female owner.

4.2 Research instrument

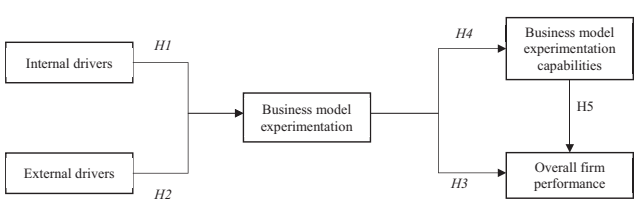
A questionnaire was developed containing several items related to BMs and BMI. The questionnaire starts with a general selection question asking if the company under study had changed its BM in the past 24 months. We deliberately chose the time frame of two years to capture possible outcomes of BM changes that may have become evident. Next, four specific selection questions were included giving examples of BMI related to the four criteria mentioned before are value proposition, new technological solutions, ecosystem and financial arrangements (introduction to Section 3). Several questions were included to verify that the companies were actually involved in BMI (Langerak *et al.*, 2004). Next, the key respondent from each firm had to prove that he/she was knowledgeable about BMI in their company (Atuahene-Gima, 2005). We assessed the respondent's suitability (Atuahene-Gima, 2005) to answer the questionnaire and their degree of knowledge (1 = very limited knowledge and 7 = very substantial knowledge) regarding new product/service development, product/service offerings and business processes. Mean responses were 5.9, 6.7 and 6.6, respectively, which indicate adequate knowledge level.

Next, based on well-known studies from literature on innovation, entrepreneurship and strategic management in relation to BMs, a Likert-type scale was used (1 = totally disagree, 7 = totally agree; Table I) to measure the items. Internal driver items were derived from Zott and Amit (2008) and were collapsed into a composite scale of innovation activities, R&D activities and product advertising. The external driver composite scale was adapted from Jaworski and Kohli (1993) into a four-item scale that comprised issues related to customer preferences and technology changes. Based on the literature review, our approach to internal and external drivers was conducted through composite measures (Henseler *et al.*, 2015). The composite factor describes a construct made up of its indicators, in contrast to a reflective approach where the indicators reflect the construct. The BM experimentation scale was adapted from Sosna *et al.* (2010) and Teece (2010). The six-item scale analysed if the firm was involved in experimenting with alternative BMs and if budget was allocated for this purpose. The BM experimentation capabilities scale was adapted from Subramanian (1996) and consisted of a six-item scale that evaluated the outcome of BMI in terms of new market opportunities, new innovations or turning ideas into reality.

Because of regulatory and ethical constraints, we could not merge the data on the firms with data from statistical offices and use objective reported performance data. The overall performance of the firms was, therefore, measured subjectively, as proposed by Venkatraman and Ramanujam (1986). McDermott and Prajogo (2012) suggest that use of subjective measures of performance is a valid proxy for objective performance measures. We used self-reported sales volume and revenue growth, when provided, for cross-validation of the construct.

The questionnaire was iterated several times and pre-tested with managers and academic experts to improve clarity of the questions. The questionnaire was developed in English and then translated into 11 languages, including Dutch, French, Finnish, German, Italian, Lithuanian, Polish, Portuguese, Slovenian, Spanish and Swedish. We used the German translation for Austrian respondents. To detect problems and cultural issues, the questionnaire was back-translated to assure that translation did not introduce any bias in the measures. Moreover, a final check was carried out on translations and their consistency by the research agency. The questionnaire was then pre-tested for every single country. A total of 806 responses were obtained but only 444 (55 per cent response rate) were completed and used in this paper.

Figure 1 Generic conceptual model



4.3 Measurement model

As a first step, we ran a factor analysis using Adanco 2.01 to confirm and validate our scales. The results indicated a very good fit of the measurement model of the total sample size (444 SMEs), with standardized root mean square residual = 0.086. According to Hu and Bentler (1999), a value of less than 0.10 is considered to be a good fit. The factor loadings of each of the

Table I Measurement model: items' loadings and reliability estimates

Construct, items	Jöreskog's rho (ρc)	Cronbach α	β
Internal drivers (Zott and Amit, 2008)			
The following internal factors motivate a change on your BM during the past 12 months			
New product development, innovation and R&D activity	0.83	0.70	0.88
Innovation and/or R&D activities			0.85
Advertising products and services in a new way			0.63
External drivers (Jaworski and Kohli, 1993)			
The following external factors motivate a change on your BM during the past 12 months			
Frequently changing customer preferences	0.85	0.77	0.67
Customer needs different to traditional customer needs			0.70
Rapid changing technology			0.85
Rapid increasing technological development			0.86
BM experimentation (Sosna et al., 2010; Teece, 2010)			
How did your enterprise deal with BM experimentation during the past 12 months			
Experimented with their BM?	0.89	0.85	0.77
Allocated budgets for BM experimentation			0.70
Came up with new ideas for our BM			0.82
Come up with new value propositions (e.g. new products or services)			0.76
Improved your BM through trial-and-error			0.72
Conducted real-life experiments with our BM			0.78
BM experimentation capabilities (inspired by Subramanian, 1996; Teece, 2017)			
In our enterprise			
Our corporate culture is focussed on constant innovation	0.90	0.87	0.82
Our enterprise shows perseverance in turning ideas into reality			0.74
Our enterprise is able to identify new opportunities			0.77
Our enterprise aims to create multiple innovations annually			0.83
Our enterprise introduces innovations that are completely new to the market			0.74
Creating more than one innovation at the same time is common practice			0.79
Overall performance (Venkatraman and Ramanujam, 1986)			
In our enterprise, we are very satisfied with			
The sales growth of the enterprise	0.92	0.90	0.80
The profit growth of the enterprise			0.86
Market share			0.77
Market penetration rate (size)			0.76
Market value			0.79
Net income			0.82
Return on investment			0.75

Note: β = standardized factor loadings

items in their respective scales were significant ($p < 0.001$), which gives evidence of convergent validity. Internal validity of the items was checked through Cronbach's alpha and Jöreskog's rho (ρc). All the values were acceptable and within the recommendations of the literature (Table I).

As it is common for multi-item reflective scales (Bagozzi and Yi, 1988), such as those used in our research, we checked for average variance extracted (AVE) for each of the constructs. The results of these indicators were consistent with the literature recommendations of a value above 0.50 for AVE (Table II). We conducted traditional analyses of discriminant validity:

- 95 per cent confidence intervals on the correlations between constructs (Anderson and Gerbing, 1988); and
- comparison of AVE with square correlations between constructs (Fornell and Larcker, 1981); results established evidence of discriminant validity (Table II).

Note that, as previously explained, internal and external drivers are treated as composite measures; therefore, there is no report of AVE for these two constructs.

However, based on recent research (Henseler *et al.*, 2015), it is also necessary to include the heterotrait–monotrait (HTMT) ratio of discriminant validity with a 0.85 cut-off point. The result of the HTMT discriminant validity test showed evidence of discriminant validity, as reported in Table III.

4.4 Common method variance

Common method variance (CMV) is a frequent problem in this type of studies, as potential bias because of the use of a single informant for each firm can be introduced. However, using more than one informant in organizational research is rather complicated, especially for SMEs. Thus, we acknowledge that CMV bias might be a problem; thus, to assess this potential

Table II Correlation matrix with AVE

Construct	Mean	SD	AVE	IND	EXD	PER	BMIC	BMEX
Internal drivers	3.97	2.03						
External drivers	4.20	1.95		0.27				
Overall performance	3.83	2.03	0.58	0.08	0.06	*0.62*		
BM experimentation capabilities	4.84	2.06	0.61	0.41	0.24	0.19	*0.61*	
BM experimentation	4.36	1.60	0.63	0.32	0.16	0.09	0.37	*0.58*

Notes: AVE = average variance extracted, SD = standard deviation. Squared root of AVE shown in diagonal; $^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$

Table III HTMT discriminant test

Construct	PER	BMIC	BMEX
Overall performance			
BM experimentation capabilities	0.49		
BM experimentation	0.34	0.69	

risk, we conducted several tests. First, we ran a latent method factor test (Podsakoff *et al.*, 2003) considering the covariance among the measures on each construct and the covariance of a common construct for all measures, and the results showed evidence that there is no common factor for all constructs. Second, we used Lindell and Whitney's (2001) marker variable technique. By means of a series of chi-square (χ^2) difference tests we found that correlations were consistent among adjusted and unadjusted correlation matrices. Third, we used the test suggested by Malhotra *et al.* (2006), where the original correlation matrix is used to estimate a structural model. The χ^2 difference test confirmed that the adjusted and unadjusted models were not statistically different.

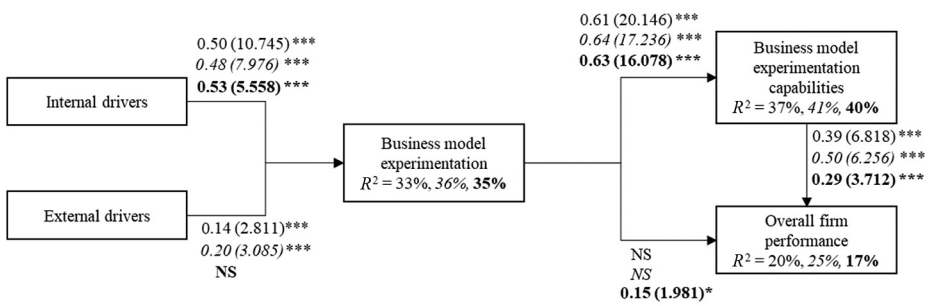
5. Results

5.1 Conceptual model

The theoretical model has been estimated with the overall sample, and in two subsamples: male-owned companies and female-owned companies. Results are presented in Figure 2. We will first look into the overall conceptual model results. In Figure 2, overall firm performance is explained by a variance of 20 per cent, and BM experimentation and BM experimentation capabilities are explained by a variance of 33 and 37 per cent, respectively. This indicates that antecedents of BM experimentation – namely, internal drivers in addition to external drivers – explained 33 per cent of the variance in BM experimentation (thus, both *H1* and *H2* are supported by the model). SEM analysis showed that BM experimentation capabilities have a direct effect on overall firm performance, $\beta = 0.39$, $t = 6.81$ and $p < 0.001$; thus, *H5* was supported in the model. Moreover, we found that BM experimentation, as indicated by the SEM analysis, has a significant relation to BM experimentation capabilities, showing the strongest significant path correlation, $\beta = 0.61$, $t = 20.14$ and $p < 0.001$; thus, *H4* was supported in the model. However, against our expectations, SEM results showed that BM experimentation has no effect on overall firm performance; thus, *H3* was not supported in the model. The results show that internal drivers have a direct positive effect on BM experimentation, as indicated by the SEM analysis showing a significant path, $\beta = 0.50$, $t = 10.75$ and $p < 0.001$. Moreover, SEM analysis revealed that external drivers have a direct positive effect on BM experimentation, as indicated by a significant path, $\beta = 0.14$, $t = 2.81$ and $p < 0.001$. Based on these results, it can be argued that both driving components, namely, internal drivers and external drivers, have a positive impact on BM experimentation, which is also an antecedent of BM experimentation capabilities.

With regard to the mediating role of BM experimentation capabilities in the link between BM experimentation and overall firm performance, the mediation tests showed that the total indirect effect between BM experimentation and overall firm performance is significant ($\beta = 0.24$, $t = 6.15$ and $p < 0.001$). Moreover, SEM results show that the direct path between BM experimentation and overall firm performance is not significant. These results indicate that there is a mediation effect of BM experimentation capabilities on this path and the specific indirect effect is ($\beta = 0.24$, $t = 6.15$ and $p < 0.001$). Thus, we conclude that the path between BM experimentation and overall firm performance is fully mediated by BM experimentation capabilities.

Figure 2 Structural models (overall sample, *male-owned companies* and *female-owned companies*)



Notes: $^{***}p < 0.001$; $^{**}p < 0.01$ and $^{*}p < 0.05$

5.2 Multi-group SEM analysis

We performed multi-group SEM analysis to assess the differences, if any, between female-owned and male-owned firms. The former subsample (N = 236) consisted of firms where a woman owns at least 50 per cent of the company and/or is involved in initiating or managing a firm that has operated for at least a year (Moore and Buttner, 1997). Results (Figure 2) showed significant differences between the two groups.

Based on these results, we found two significant differences in the following paths: the path between external drivers and BM experimentation and the path between BM experimentation and overall performance. The results show that for female-owned businesses, the path between external drivers and BM experimentation is not significant, whereas this path is positive for male-owned businesses (β = 0.20, t = 3.08 and $p < 0.001$). This result indicates that female-owned businesses and male-owned businesses are different in this path. The results also show that for male-owned businesses, the path between BM experimentation and overall firm performance is not significant, whereas this path is positive for female-owned businesses (β = 0.15, t = 1.98 and $p < 0.05$).

There were also some slight differences between male-owned and female-owned businesses in the other suggested paths. For example, the path between internal drivers and BM experimentation is significant for male-owned firms (β = 0.48, t = 7.98 and $p < 0.001$), and for female-owned firms the effect is stronger (β = 0.53, t = 5.56 and $p < 0.001$). Moreover, the results show that the path between BM experimentation and BM experimentation capabilities is significant for male-owned firms (β = 0.64, t = 17.24 and $p < 0.00$) and for female-owned firms (β = 0.63, t = 16.08 and $p < 0.001$).

Finally, the path between BM experimentation capabilities and overall firm performance is significant for male-owned firms (β = 0.50, t = 6.26 and $p < 0.001$), whereas for female-owned firms the effect is weaker compared to their male counterparts (β = 0.29, t = 3.71 and $p < 0.001$). Also, note that the explained variance for the models differs; for instance, for female-owned businesses, overall firm performance is explained by a variance of 17 per cent, whereas for male-owned businesses, the explained variance is 25 per cent. Moreover, there is also a difference in BM experimentation capabilities, as it is explained by a variance of 39 per cent for female-owned businesses, while for male-owned businesses, the explained variance is 41 per cent. A detailed analysis on the indirect effects can be found in Table IV.

6. Discussion

Our research offers important contributions to BMI research from a gender perspective. First, the SEM analysis confirmed the theoretical model for the overall sample of SMEs and showed that BM experimentation, as well as BM experimentation capabilities, as mediators, play an important role in overall performance (directly). This confirms the qualitative findings of Heikkilä *et al.* (2018). In addition, both internal and external drivers positively influence BM experimentation, and in turn, BM experimentation capabilities and performance of SMEs. Indirect effects (Table IV) highlight the greater influence of internal drivers and lower impact of external drivers on BM experimentation and performance. This contrasts with prior research, which showed a similar importance of internal and external pressures to change a firm's BM for sustainability (Rauter *et al.*, 2017) or a more prominent role of external drivers in BM experimentation (Ghezzi *et al.*, 2015). Acknowledging the importance of monitoring external factors, such as competitive intensity and technology turbulence, we encourage academics and managers to be especially sensitive to internal factors, such as innovation or business strategy, as they are proven to be highly influential drivers of BM experimentation, BM experimentation capabilities and performance.

In our study, we also contribute to BM and gender research areas by proposing that antecedent factors to BMI and overall firm performance are potentially gendered, that is, female and male business owners place greater emphasis on different antecedents, and the way BMs are created or innovated by female and male entrepreneurs differs, with potential implications for venture success. Findings suggest that the majority of the hypothesized effects are different for the female subsample compared to the male subsample (*H2*, *H3* and *H5*). In comparison to non-female-owned businesses, the effect of BM experimentation on firm performance is smaller for female-owned firms (lower explained variance), the path linking internal drivers to BM experimentation is slightly greater, the impact of BM experimentation on firm performance is significant and positive (while for non-female-owned businesses, the path is non-significant) and the influence of external drivers on BM experimentation is non-significant (but significant and positive for the male subsample). No differences exist between the two gender subsamples in the remaining path: BM experimentation to BM experimentation capabilities (*H4*).

However, an interesting result is the difference in the path between BM experimentation and firm performance: the impact of using BM experimentation capabilities on performance is considerably less for women (0.29) than for men (0.50). This may be because of the fact that female CEOs may have stronger external pressures to succeed, and thus, adopt a more risk-averse attitude than men (Harjoto *et al.*,

Table IV Indirect effects

Indirect effects	Total sample	Male-owned	Female-owned
Internal drivers -> BM experimentation capabilities	0.30 (8.95) ***	0.31 (6.72) ***	0.33 (6.24) ***
Internal drivers -> Overall performance	0.16 (6.05) ***	0.15 (4.13) ***	0.18 (4.42) ***
External drivers -> BM experimentation capabilities	0.08 (2.94) ***	0.13 (3.01) ***	0.07 (1.55)
External drivers -> Overall performance	0.04 (2.92) *	0.06 (2.65) ***	0.03 (1.44)
BM Experimentation -> Overall performance	0.24 (6.41) ***	0.32 (5.51) ***	0.18 (3.48) ***

Note: *t*-values in parentheses

2015), which may lead women in top management positions to adopt a reiterative learning process to make sure that BMI will be successful before making any real changes to their firm's BM. BM experimentation and trail before implementation improve firm performance directly in companies run by women and indirectly in non-female-owned businesses. Another reasoning behind this finding is that female managers and entrepreneurs need more time and investment in capabilities to take advantage of extensive experimentation before implementation because they have fewer (female) role models engaged in BM experimentation to inspire them, making women's business practice more difficult than men's (Díaz-García and Byrne, 2017). Indeed, female CEOs are a minority in organizations, with specific behaviours with regard to innovation and management. Drawing on prior feminist studies on entrepreneurship (Eriksson-Zetterquist and Styhre, 2008; Ross-Smith and Huppatz, 2010) and a gender-aware conceptualization of innovation (Nählinder *et al.*, 2015), it seems that women in top management positions, entrepreneurship and innovation are seen as marginalized individuals and seldom seen as managers or innovators. Also, in public debates on entrepreneurship and start-up ventures, attention to businesswomen's work is scarce. Because of the lack of role models, female entrepreneurs might be more careful, and, perhaps, even hesitant, in exploiting their BM experimentation capabilities.

There are also differences in indirect effects, highlighting the non-significant influence of external drivers on BMI and on overall firm performance for female-owned businesses. Results show slightly higher indirect effects of internal drivers for female-owned businesses compared to non-female-owned firms or to the overall sample. As there are still significant research gaps in the understanding of internal drivers of BMI (Foss and Saebi, 2017), our results contribute to scholarship by evidencing the importance of internal forces to drive BM experimentation and BMI, especially for female-owned businesses. The non-significant influence of external drivers on BM experimentation for the female subsample contrasts with the belief that businesswomen heavily rely on supportive external environments (Sperber and Linder, 2018). One implication of our results relates to the fact that female-owned businesses are managed with a more focussed and personal approach (Neergaard and Christensen, 2017), shifting their attention from external to internal driving forces. Considering that women usually own smaller businesses (Khalife and Chalouhi, 2013), monitoring internal drivers may be easier. However, managers should find an appropriate balance between internal and external drivers of BM experimentation, BM experimentation capabilities and firm performance. By doing so, a wider typology and more nuanced insights into BMI can be obtained and made available (Foss and Saebi, 2017), and firms may achieve higher levels of success.

Another important contribution of our findings is that it is evidenced that for SME entrepreneurs, experimenting with their BMs does lead to improved performance because financial aspects underpin BMs (Oliveira *et al.*, 2018) and BMI. Moreover, there is a clear need for more in-depth analyses of female entrepreneurship. Theory development in this domain is rather limited and mainly focussed on personal motives and characteristics of female entrepreneurs, and less on their actual behaviour while experimenting with BMs and the capabilities needed to do so. A research agenda developed for entrepreneurial leadership suggests that a gendered analysis is needed to develop new theory (Harrison *et al.*, 2015). Meroño-Cerdán and López-Nicolás (2017) conducted a survey among family firms managed by women and men in an attempt to develop a theory to explain female leadership in family companies. They reported that gender differences in type of business and in manager's profile found in the management literature disappear in family businesses. Therefore, it would be important to test our model in other settings in future research.

7. Conclusions, implications and limitations

BMI and BM experimentation are important to keep up with technology changes, changing market demands and to implement strategic changes. Moreover, BMI and experimentation are necessary to capture the value of new product development and change the service logic. The current paper contributes to the literature by exploring a model that discusses antecedents and outcomes of BMI, using SEM, for SMEs and, more specifically, by comparing SMEs that are male-owned with female-owned ones. We found different patterns between female-owned businesses and non-female-owned ones.

First, we contribute to gender theory by analysing BMI through a gender lens. To the best of our knowledge, the present study is the first attempt to examine the antecedents of BMI and its impact on firm performance through a feminist theory of gender. As other perspectives of feminist theory, the post-structural feminist approach sees gender as socially and culturally constituted (Wu *et al.*, 2019), analyses gender inequality as a resource (Grosser and Moon, 2019) and posits that gender discrimination is diminishing (Soklaridis *et al.*, 2017). Our model and findings support those ideas and contribute to theory by highlighting the distinctive impact of women's presence in management on BM experimentation, BM experimentation capabilities and firm performance. The positive results obtained by female-owned firms confirm that women at top management positions are unique resources, with a specific capacity for innovation (BMI) and a distinct behaviour with regard to experimentation, thus, supporting the idea that women are more involved in learning–innovating sequences than men (DeTienne and Chandler, 2007).

Furthermore, our research contributes to the literature on BMI by providing new and important insights into the interrelationships among antecedents of BMI and overall firm performance, with a gender approach. Our contribution to BMI research relates to the distinction made between BM experimentation and BM experimentation capabilities as an outcome. Prior research has usually adopted a narrower approach and is not always transparent in terms of identifying whether the process or the outcome of BMI are being studied (Huang *et al.*, 2014). Differently from scholars who view BMI as a discrete outcome (Amit and Zott, 2012), we view it as a process of strategic transformation (Foss and Saebi, 2017; Demil and Lecocq, 2010), where BMs are subject to continuous refinement and modification (Demil and Lecocq, 2010). Moreover, we contribute by considering both internal and external drivers in the same model. Recent research

conceptualizes the effects of both types of drivers of BMI without empirical support (Foss and Saebi, 2017) or focusses on just one driving factor forcing a firm to modify its BM (Müller *et al.*, 2018). In addition, the relation between BM experimentation, BM experimentation capabilities and performance – with the latter either measured objectively or subjectively – is still understudied. Thus, our study provides insights into the relation between antecedents of BM experimentation, BM experimentation capabilities and the resulting performance. Finally, our study analyses BMI influences in the context of SMEs, while BM and BMI literature traditionally has focussed on large firms (Bowyer and Chapman, 2014).

Managerial implications are clear. First, SMEs need to be vigilant of their BM and to critically examine their long-term feasibility and sustainability. BM experimentation plays an important role in companies' BM experimentation capabilities (directly) and overall performance (indirectly). In addition, both internal and external drivers positively influence BM experimentation, and in turn, BM experimentation capabilities and firm performance. Nevertheless, indirect effects show that the influence of internal drivers is significantly greater in comparison to the impact of external drivers on BMI and performance. Acknowledging the importance of monitoring external factors such as competitive intensity and technology turbulence, we encourage academics and managers to be especially sensitive to internal factors such as innovation or business strategy, as they are proven to be highly influential drivers of BM experimentation, BMI and performance. Finally, our results evidence and imply that firms run or owned by women must be aware that their organizations will get different outcomes of their BMI activities. As predicted by post-structural feminist theory, gender inequality is decreasing (Soklaridis *et al.*, 2017), with a growing number of managers and firms implementing programmes to promote women to top management positions and boards (Wang and Kelan, 2013). In contrast to men, women seem to experiment with their firm's BM not only to improve the firm's capabilities but also to enhance its performance directly. Women's capacity to learn from BM experimentation pays off and supports the fact that, in practice, gender is not fixed but constructed through learning from daily interactions with others (Harrison *et al.*, 2015).

There are some limitations to our research that must be acknowledged. This is a quantitative cross-sectional research with limitations with regard to the sample, sample size, representativeness and the possibility to draw firm conclusions on causality. This paper is one of the first results of a European project in which we built a platform and tooling specifically geared towards SMEs, while at the same time doing panel research and in-depth qualitative research on BMI (Heikkilä *et al.*, 2018). The interaction between the quantitative and the qualitative case-study research does lead to deeper insights and theory development. We have not yet gained enough in-depth insight into BM experimentation, causal mechanisms and the relevance of its outcomes. In this research, we singled out one core factor – gender – but we are aware that there are several other views to take on in relation to BMI and BM experimentation. These views can not only be related to size of the firm, industry sector but also to the nature of the BMI, for instance, the role of IT as a driver or an enabler. Additionally, we do not know enough about how BMI takes place and what is the impact of changes – for instance, modifications in individual BM components – on performance. We also need to understand how management conducts BMI, the way change management is handled with regard to BMI, and the role of tools and their impact on performance. Finally, testing our model in other settings needs further research. For instance, in firms where female managers supervise other women; acknowledging that women hierarchically managed by other women may have a different behaviour (Hurst *et al.*, 2018), we posit that further research is needed.

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