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The digital paradox in social innovation: the interplay between digital maturity and business model innovation

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Abstract

Purpose – This study aims to analyse how the business environment and digital maturity influence companies' ability to develop social innovation and to explore the moderating role that business model innovation (BMI) can play in these relationships. The research seeks to provide new evidence on the interaction between internal capabilities and external contexts in the generation of innovation with social impact.

Design/methodology/approach – The research is based on data from Eurobarometer Flash 486, which includes a representative sample of 12,615 companies in the European Union. Using a multivariate regression approach, the individual and combined effects of the business environment, digital maturity and BMI on social innovation are evaluated. The theoretical framework integrates the resource-based view, dynamic capabilities theory, open innovation theory, institutional theory and social innovation systems.

Findings – The results confirm that both a favourable business environment and greater digital maturity are positively associated with social innovation. However, the most relevant finding shows a negative moderating effect of the BMI on the relationship between digital maturity and social innovation, suggesting organisational tensions arising from simultaneous digital and structural transformations, such as resource overload and ambidexterity challenges in balancing efficiency and social goals. This result underscores the non-linear nature of capability interactions and the importance of proper strategic alignment. On its own, digital maturity has a positive and significant effect, establishing itself as a key organisational capability for addressing social challenges through innovative solutions.

Originality/value – This work contributes to a more systemic and contingent understanding of social innovation in organisations. Integrating technological, contextual and strategic lenses, we challenge the assumption of linear complementarity among capabilities and, using paradox theory, theorise the tensions in capability orchestration that shape social innovation outcomes. The findings yield practical implications for managers and policymakers, including sector-specific guidance for organisations in education and healthcare. They also open new research avenues on organisational ambidexterity and capability orchestration in sustainability-oriented companies.

Keywords Social innovations, Business environment, Digital maturity, Business model innovation

Paper type Research article

1. Introduction

In a scenario marked by growing social and environmental challenges, social innovation is emerging as a strategic lever for companies to promote collective well-being. Moreover, the European Union, through initiatives such as Horizon Europe, has strengthened the social economy and sustainable development, thereby providing a regulatory environment that

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encourages impactful solutions (Bonnedahl *et al.*, 2022; European Commission, 2021). Consequently, understanding the drivers of social innovation in business is essential today, especially in a context of rapid digitalisation and a growing demand for socially responsible business models (Markman *et al.*, 2016).

Nevertheless, there is no consensus on the concept of social innovation, as its interpretation varies according to discipline and context. On the one hand, some authors see it as a novel response to social needs, whereas others focus on its transformative and disruptive nature (Slee *et al.*, 2021; Nazarí *et al.*, 2024). In this paper, we adopt the functional definition of the Stanford Centre for Social Innovation: "a novel solution to a social problem that is more effective, efficient, sustainable or fair than current solutions, and whose value created primarily benefits society as a whole rather than private individuals" (Guenther and Guenther, 2013, p. 155). This definition integrates efficiency, sustainability, and fairness, and serves as a framework for analysing how companies combine economic objectives and social commitment to generate collective value.

This study explores how companies develop and implement social innovations in a context marked by social tensions, ecological crises, and demands for equity. In effect, social innovation occupies a central place in the sustainability paradigm, integrating solutions that address economic, social, and environmental challenges (Boons and Lüdeke-Freund, 2013; Ghobakhloo *et al.*, 2021; Nuchian *et al.*, 2024). Therefore, companies are expected to move from being mere observers or causes of structural problems to acting as agents of change committed to sustainable, inclusive, and resilient development (Del Rio Castro *et al.*, 2021; United Nations, 1999). Through these practices, organisations contribute to collective well-being, improve their reputation, foster customer loyalty, enter new markets, and create sustainable competitive advantages (Osorio *et al.*, 2024; Westley *et al.*, 2006; Mirvis *et al.*, 2016; Porter and Kramer, 2011).

Interest in the dual economic and social benefits of social innovation has grown among academics and professionals seeking to identify the factors that facilitate it in companies. Specifically, this field has made particular progress in social entrepreneurship and social enterprise, driven by an increase in publications in recent decades (Boons and Lüdeke-Freund, 2013; Gasparin *et al.*, 2021; Nuchian *et al.*, 2024). However, much of the research is limited to descriptive studies or isolated cases, without examining in depth the organisational and strategic mechanisms that enable successful social innovation (Ardito *et al.*, 2019; Du *et al.*, 2022; Inigo *et al.*, 2020). This gap raises the central question of this paper: what internal and external resources drive the development of social innovation in companies? The literature suggests that these elements act in a complementary manner (Bharadwaj *et al.*, 2013; Zahra and Wright, 2015).

In terms of internal resources, human, financial, and physical resources stand out (Short *et al.*, 2009). Moreover, some authors have included strategic knowledge as a source of sustainable competitive advantage (Knott and Vieregger, 2020; Liu and Atuahene-Gima, 2018). In this regard, digital technologies have established themselves as key facilitators of innovation processes, enabling new forms of creation, recombination, and dissemination of innovations beyond traditional organisational boundaries (Nambisan *et al.*, 2019; Ferreira *et al.*, 2019), which is particularly relevant for innovations aimed at creating social value.

In the current context, digital maturity is an essential strategic capability. Defined by the level of integration of digital technologies into processes, structures, and organisational culture, it enables companies to detect opportunities, collaborate across sectors, and develop solutions aimed at the common good (Bharadwaj *et al.*, 2013). It also increases agility and facilitates the adaptation of socially focused processes (Berjman, 2012). However, recent studies call for further investigation into the contribution of digitalisation to sustainability (Guandalini, 2022, p. 462) and even warn of a possible gap between digitalisation and sustainable innovation (Usai *et al.*, 2021). Therefore, in order to understand how digitisation processes effectively translate into sustainable results, digital maturity is analysed as a key factor in this research. In this context, and based on previous literature, this study

conceptualises digital maturity as an enabling organisational capability that allows companies to systematically deploy and coordinate their digital resources to support innovative outcomes, including those of a social nature. This approach explicitly distinguishes digital maturity from digitisation or digital transformation processes, which refer to general technological changes, placing digital maturity at the level of internal capabilities that determine how and to what extent these changes translate into organisational results.

In addition to internal resources, it is crucial to consider the external factors that shape the business environment, including institutional quality, available resources, supportive public policies, and the density of collaborative networks. A framework that promotes sustainability, stimulates inter-organisational cooperation, and supports entrepreneurship, in turn, enhances internal capabilities and facilitates socially innovative solutions. For example, recent studies show that a solid institutional infrastructure and dense social capital favour the emergence and scaling of social innovations (Milley *et al.*, 2018; Oliveira *et al.*, 2025), although their real influence on the business development of social innovation requires further analysis.

Digital maturity and the business environment are interdependent and shape the framework for social innovation. In this sense, a collaborative environment with adequate resources and stable regulations enhances the use of digital technologies in impact solutions, but these relationships are not always linear and can be affected by organisational factors (Teece, 2010; Inigo *et al.*, 2020). To theorise these interactions, we adopt the Resource-Based View (RBV) and Dynamic Capabilities Theory (DCT) as core frameworks: RBV positions digital maturity as a valuable resource for social innovation (Barney, 1991), while DCT explains reconfiguration needs amid environmental pressures (Teece, 2010). Open Innovation and Institutional Theory serve as boundary conditions, highlighting collaborative networks and regulatory influences, respectively, without assuming linear complementarity, thus addressing potential conflicts in hybrid social–economic goals (Smith and Lewis, 2011).

Business model innovation (BMI) is essential for sustainable practices, as it redefines revenue mechanisms and integrates responsible solutions (Foss and Saebi, 2017; Geissdoerfer *et al.*, 2018). By transforming the value proposition, delivery processes, and value capture, a framework is created for responsible practices that reinforce social commitment (Teece, 2010). Therefore, companies with innovative BMI respond better to sustainability demands, and in social innovation, BMI drives value creation and delivery, promoting proposals for social impact and strategic differentiation (Souto, 2015; To *et al.*, 2019). However, the role of BMI in linking digital maturity and social innovation may be paradoxical, as it can both enable and constrain the translation of digital capabilities into social outcomes. From a conceptual perspective, innovation in the business model is understood in this study as a structural change in the organisational logic of the company, which deliberately reconfigures the mechanisms of value creation, delivery, and capture.

Although digital maturity, the business environment, and BMI are receiving increasing attention, the academic literature examines them in a fragmented way, which limits our understanding of how they interact to foster social innovation. Consequently, it remains difficult to understand how these variables, when considered together, enhance a firm's capacity for innovation with social impact in a digitalised and competitive environment. Motivated by this gap, the present study poses two key questions, namely: (1) How do digital maturity and the business environment influence the social innovation developed by a company? and (2) To what extent does BMI moderate this relationship?

This study addresses these questions through an integrative approach that considers technological, contextual, and organisational dimensions. Specifically, it provides evidence of how companies combine digital maturity, the business environment, and BMI to move towards more sustainable, inclusive, and competitive practices. In addition, it analyses the impact of digital maturity and the business environment on social innovation and examines the moderating role of BMI by developing a theoretical model that integrates these four variables. In doing so, the study offers a solid conceptual framework to guide companies in generating social value in an increasingly digital and competitive environment.

To assess the factors influencing social innovation in companies, statistical techniques were applied to data obtained from Eurobarometer Flash 486 as a secondary source. This survey allowed for the examination of a representative sample of 12,615 European companies, 94.8% of which are SMEs. In particular, the study reveals that digital maturity drives social innovation in companies, especially in the education, health, and culture sectors (Ardito *et al.*, 2019). Likewise, the business environment has a positive effect, although this effect is attenuated in more complex models (Oliveira *et al.*, 2025). By contrast, the interaction between digital maturity and BMI is negative, suggesting that social innovation requires specific approaches. Finally, belonging to a business group does not have a significant impact, underscoring the importance of analysing contextual and strategic factors separately.

This document is organised as follows. First, Section 2 presents a review of the literature and formulates hypotheses related to the main variables of the study: social innovation, business environment, digital maturity, and BMI. Next, Section 3 describes the methodology used, after which Section 4 presents the results obtained. Section 5 discusses the main findings, and finally, Section 6 summarises the conclusions of the research.

2. Literature review and hypothesis

2.1 Social innovation

The concept of social innovation remains broad and multidimensional, giving rise to different interpretations depending on the research approach. In this regard, Van der Have and Rubalcaba (2016) highlight this diversity, pointing out that the definition of social innovation varies significantly depending on the perspective adopted. In fact, Edwards-Schachter and Wallace (2017), in a systematic review of more than 250 definitions, conclude that social innovation is a polysemic and contested concept, whose evolution has been marked by the intersection of academic, political, and practical discourses. For this reason, authors such as Slee *et al.* (2021) and Abad and Ezponda (2021) insist on the need to clarify the different conceptual currents before adopting an operational definition.

One of the most widely accepted definitions today is that proposed by the Centre for Social Innovation at Stanford Graduate School of Business, which understands social innovation as "a new solution to a social problem that is more effective, efficient, sustainable, or fair than existing solutions and whose value created benefits society as a whole rather than private individuals" (Guenther and Guenther, 2013, p. 155). This perspective allows for the integration of both social and organisational components and has been widely used in business and public policy studies. Similarly, the European Commission (2013) emphasises the role of new ideas and collaborative models in improving social well-being and strengthening social cohesion in contexts of transformation.

However, the approach proposed by Mulgan (2006), who describes social innovation as "innovative activities and services motivated by the goal of meeting a social need," remains relevant as a historical reference, given its significant influence on European discourse during the past decade. In the business context, this concept has gained relevance as it has been integrated into organisational strategies to address complex social challenges. For example, Rao-Nicholson *et al.* (2017) analyse how social innovation transcends borders, drawing on interactions among multiple actors, from companies to national and transnational institutions. Likewise, Gopaldas (2015) highlights that companies are taking on an increasingly active role in leading social innovation, responding to pressures from both internal and external stakeholders. In part, this corporate momentum reflects the need to meet growing expectations regarding social responsibility and sustainability.

In short, social innovation is an evolving field that challenges companies to go beyond traditional economic objectives, encouraging them to incorporate practices and business models that address social and environmental problems. Therefore, given its broad scope and multiple applications, it is essential to understand the different theoretical perspectives that

underpin these practices, as well as the role of factors such as digital maturity and the business environment in their promotion and consolidation.

2.2 Theoretical perspectives on social innovation

Research on social innovation has approached this topic from various theoretical perspectives, each of which provides a complementary view of the phenomenon. In particular, Collaborative Network Theory highlights the crucial role of networks among companies, NGOs, governments, and other actors, as inter-organisational cooperation generates synergies that facilitate the identification of social needs and the implementation of innovative solutions (Logue, 2019). In fact, according to Gasparin *et al.* (2021) and Rao-Nicholson *et al.* (2017), these networks are a key driver of social innovations with a positive societal impact.

However, the question arises as to what motivates companies to engage in social innovation. In this regard, stakeholder theory offers a relevant explanation, suggesting that companies do not respond solely to shareholder expectations but must also address the interests of other stakeholders, such as customers, employees, and society at large (Porter and Kramer, 2011; Tortia *et al.*, 2020). Consequently, engagement in social innovation requires firms to align their strategies with the needs and expectations of these diverse stakeholder groups.

From a contextual perspective, the business environment is understood as a broad construct encompassing institutional and regulatory dimensions, as well as financial, relational, and human capital conditions that shape business activity. Within this framework, the institutional environment is considered a sub-dimension of the broader business environment rather than a distinct concept.

Accordingly, the business environment plays a pivotal role, as social norms, regulations, and competitive pressures directly influence firms' social innovation practices. In this vein, DiMaggio and Powell (1983) argue that organisations adopt innovations in response to coercive, normative, and mimetic forces, leading them to conform to prevailing social and regulatory expectations. Moreover, Bonnedahl *et al.* (2022) and Ruela *et al.* (2024) conceptualise the social innovation ecosystem as a setting in which organisational structures and sustainability-oriented policies facilitate collaboration among companies and other actors, resulting in business-driven solutions to social problems.

From a resource-based perspective, the Resource-Based Approach emphasises the importance of strategic resources in enabling firms to develop competitive innovations, including social innovations. In this context, digital maturity emerges as a key resource, as it enhances firms' capacity to innovate in a socially responsible manner, as highlighted by Schiavone *et al.* (2021) and Foroudi *et al.* (2021).

Taken together, these theoretical perspectives indicate that social innovation does not occur in isolation but depends on a complex interaction of factors, including inter-organisational collaboration, stakeholder management, the availability of strategic resources, and digital maturity. Among these, the business environment is particularly salient, as it defines both the opportunities and constraints firms face when designing and implementing social innovations. The following section therefore examines how specific characteristics of the business environment may influence organisations' capacity to develop innovations with positive social impact.

2.3 Integrating theoretical perspectives: complements and conflicts

The reviewed theories complement each other in explaining social innovation as a multi-level phenomenon. Collaborative Network Theory and Stakeholder Theory emphasise external alliances (Logue, 2019; Porter and Kramer, 2011), while RBV and DCT focus on internal resource orchestration for sustained impact (Barney, 1991; Teece, 2010). Open Innovation bridges these perspectives by facilitating knowledge inflows (Chesbrough, 2003), and Institutional Theory contextualises organisational pressures (Scott, 2014). However, conflicts

arise from assumptions of linearity: RBV's relatively static view of resources may overlook the dynamic reconfiguration costs highlighted by DCT, particularly in hybrid contexts where economic efficiency clashes with social goals, leading to ambidexterity tensions (Smith and Lewis, 2011). This study advances beyond fragmented applications (e.g. isolated RBV approaches in digital maturity studies; Bharadwaj *et al.*, 2013) by proposing a contingent integration, in which DCT mediates RBV effects under institutional constraints, thereby illuminating non-linear interactions such as those between digital maturity and BMI.

2.4 Social innovation and business environment

Social innovation developed by companies—both public and private, for-profit and non-profit—is facilitated by an appropriate business environment. In this sense, the business environment encompasses the external factors and conditions that influence organisational activities, competitiveness, and innovative capacity, including government policies, regulations, access to financial resources, available technologies, human capital, and collaboration networks (Porter and Kramer, 2011; Zahra and Wright, 2015).

The relevance of the business environment as a key driver of social innovation is supported by several theoretical perspectives. For instance, Open Innovation Theory highlights the importance of firms integrating both internal and external resources to foster innovation, as such openness enables access to new ideas and novel solutions (Chesbrough, 2003). In parallel, Social Capital Theory underscores the role of inter-organisational networks and relationships, showing that a collaborative environment facilitates the development of social innovation (Putnam, 2000).

Mulgan (2006) argues that open organisational cultures are essential for promoting social innovation, particularly when firms operate in contexts that favour openness and facilitate access to financial resources. Similarly, Rao-Nicholson *et al.* (2017) and Van Tran *et al.* (2024) emphasise that government support and social capital networks are fundamental to fostering open social innovation, as they ease access to external resources and promote inter-organisational collaboration. Consequently, the business environment is shaped not only by market competition but also by public subsidies that support social innovation practices. However, when addressing social innovation specifically, firms' resources and motivations may be more constrained than in other forms of innovation (Mulgan, 2006).

The literature examining the influence of the business environment on social innovation is extensive and offers diverse perspectives (Shin, 2016; Vanderhoven *et al.*, 2020), although much of it focuses on specific case studies (Martens *et al.*, 2021; Moore *et al.*, 2012). Given this diversity, the present study hypothesises that the business environment exerts a significant influence on firms' social innovation. Using data from 12,615 European companies, it explores how business environment conditions affect organisations' capacity to develop social innovations.

H1. The business environment positively influences the social innovation of products, services or processes aimed at improving society.

2.5 Social innovation and digital maturity

Digital maturity is conceived as an enabling organisational capability that reflects the degree to which companies have developed, integrated, and systematised digital resources and processes, allowing them to coordinate activities and strategically reconfigure routines (Bharadwaj *et al.*, 2013; Teece, 2010).

In this regard, alongside the recognised importance of the business environment for social innovation, digital maturity emerges as another key factor in the transformation of organisations towards more innovative and socially responsible business models. Operationally, digital maturity refers to the level of development, integration, and effective exploitation of digital technologies by an organisation. In particular, Westerman *et al.* (2014)

define digital maturity as the transformation of processes, operations, and business models through advanced digital technologies, noting that companies must integrate organisational, strategic, and cultural capabilities to drive innovation and compete in the digital economy.

According to the RBV, competitive advantages derive from valuable, rare, difficult-to-imitate, and non-substitutable resources (Barney, 1991; Peteraf, 1993). From this perspective, digital maturity is not a resource in itself, but rather an organisational capability that enables companies to integrate, coordinate, and leverage digital resources within organisational processes. Through this enabling function, digital maturity facilitates the identification of social needs and the generation of shared value. For example, Qureshi *et al.* (2021) highlight that digital technologies enable new forms of interaction, collaboration, and co-creation of social value, expanding organisational capabilities to implement digital social innovation processes. Digital platforms and social networks can connect companies with communities and external actors, fostering scalable and customised solutions (Millard and Carpenter, 2014). Windrum *et al.* (2016) note that high digital maturity allows organisations to participate in multi-agent co-creation processes via digital platforms, facilitating collaboration with various stakeholders in the design of social solutions. Consequently, this ability to articulate networks reinforces their role as key relational infrastructure for social innovation. Likewise, George *et al.* (2016) emphasise that organisations with strategic capabilities can address major social challenges, such as sustainability or poverty, through innovation, suggesting that digital maturity can act as a critical resource for aligning business strategies with social objectives.

Furthermore, digital transformation is presented as an essential driver for fostering entrepreneurial and innovative behaviour within companies (Berman, 2012; Ritala *et al.*, 2021; Westerman *et al.*, 2014). Digital maturity improves organisational performance by enhancing technological capabilities and plays a fundamental role in social innovation, providing the necessary tools to generate solutions that respond to contemporary social challenges (Ferreira *et al.*, 2022; Heredia *et al.*, 2022). Schiavone *et al.* (2021) argue that digital maturity facilitates access to information and tools for companies to develop effective social innovations. Similarly, Foroudi *et al.* (2021) highlight that companies with greater digital maturity are better positioned to adapt to environmental changes and meet customer needs, which is essential for the successful implementation of social innovations.

Consequently, based on the existing literature on the impact of digital maturity on social innovation, we formulate the second hypothesis of this study:

H2. Digital maturity positively influences the social innovation of products, services or processes aimed at improving society.

2.6 The moderating role of innovation in business models

BMI is conceived as a process of structural change that involves the deliberate reconfiguration of the mechanisms for creating, delivering, and capturing value within a company (Teece, 2010; Foss and Saebi, 2017). In this sense, BMI has become a key strategic component in today's business environment, especially when addressing sustainability and social innovation. Teece (2010) emphasises that BMI not only drives economic value, but also enables companies to structurally integrate social and environmental objectives, which is crucial in an environment where sustainability and social responsibility are increasingly valued. Consequently, sustainable business models are those that not only seek profitability, but also generate a positive social impact (Inigo *et al.*, 2020). Similarly, Battilana and Lee (2014) argue that social innovation is closely related to innovation in business models, as companies, by redefining their ways of creating and delivering value, can effectively address social challenges through new organisational, technological, and value approaches. In this context, the concept of structural ambidexterity provides an additional key: it allows organisations to simultaneously manage economic and social objectives through the internal differentiation of structures and processes. For example, Altuna *et al.* (2015) show how the

organisational separation of social innovation activities in the case of Intesa Sanpaolo favours their integration into conventional business models, facilitating the generation of social impact from profit-oriented structures.

As organisations advance in digitalisation, they face the challenge of integrating digital maturity with BMI. According to the RBV (Barney, 1991), companies that possess unique resources, such as a mature digital infrastructure and an innovative business model, have a significant competitive advantage that can enhance social innovation. In this sense, digital maturity not only improves a company's operational efficiency, but also facilitates collaboration with social actors and organisations, promoting the exchange of knowledge and resources necessary to address complex social problems (Light and Luckin, 2008). Thus, this integration of advanced digital capabilities and a sustainable business model can accelerate the creation of innovative and scalable solutions, generating a positive impact at both the organisational and social levels (Westerman *et al.*, 2014; Qureshi *et al.*, 2021). In this way, innovation in the business model acts as a catalyst that amplifies the role of digital maturity in promoting social innovation (Olofsson *et al.*, 2018).

Recent research has explored how BMI can act as a moderator in the relationship between digital maturity and social innovation. Botti and Baldi (2025) highlight that BMI, when combined with digital maturity, enables firms to develop sustainable and inclusive solutions aligned with the principles of Industry 5.0, emphasising the integration of technology with social and environmental well-being.

In line with this proposition, we anticipate a positive moderation in aligned contexts, as BMI enables the reconfiguration of resources for social value through alliance capabilities that orchestrate external knowledge and enhance sustainability-oriented innovation (Inigo *et al.*, 2020). From a dynamic capabilities perspective, business models shape, and are shaped by, firms' abilities to reconfigure resources to create value (Teece, 2010). However, the role of BMI as a moderator is inherently paradoxical. While innovative business models can amplify the positive effects of digital maturity and a favourable business environment, allowing firms to scale solutions with social impact, they can also introduce tensions and misalignments that hinder social objectives (Smith and Lewis, 2011; Foss and Saebi, 2017). This ambivalence arises because BMI requires balancing economic and social logics within the same organisational structure, leading to trade-offs and managerial complexity. In high-ambidexterity contexts, such simultaneous transformations can overload resources or trigger goal conflicts (Smith and Lewis, 2011; Stettner and Lavie, 2014). Therefore, although the overall expectation is positive, paradox theory helps explain the conditions under which this moderation may weaken or reverse.

From this perspective, BMI can be understood as an organisational mechanism that structures how digital capabilities are prioritised and deployed within the firm. Rather than acting as an automatic complement to digital maturity, changes in the business model may reorient strategic priorities and resource allocation, thereby conditioning how digital capabilities translate into social innovation outcomes under specific organisational conditions.

In relation to this reasoning, we propose the following hypothesis:

H3. Business model innovation moderates the relationship between digital maturity and social innovation, potentially altering or limiting the positive effect of digital maturity under certain organisational conditions.

The impact of the business environment on social innovation within companies can also be moderated by BMI. The business environment, characterised by factors such as technological change, regulatory pressures, social expectations, and sustainability demands, plays a fundamental role in the evolution of social innovation within companies. However, for these business environment factors to effectively drive social innovation, it is crucial that companies possess an innovative business model that allows them to adapt quickly and capitalise on external opportunities (Olofsson *et al.*, 2018). Innovation in business models facilitates this adaptation, as it enables companies to redefine how they create, deliver, and capture value,

providing greater flexibility to address external challenges while enhancing their social impact (Teece, 2010; Carayannis *et al.*, 2021).

In this context, innovative business models, particularly sustainable ones, act as a platform for creating social value in a manner that responds to the pressures and demands of the business environment. Phills *et al.* (2008) argue that innovative business models not only focus on profitability, but can also facilitate the creation of strategic partnerships, the adoption of advanced technologies, and the implementation of new distribution channels. These elements enable companies to respond more agilely to changing environmental dynamics and to improve the development of social solutions that generate a lasting impact (Schaltegger *et al.*, 2012; Byerly, 2014).

Furthermore, the interaction between an innovative business model and a dynamic business environment can enhance a company's competitiveness by aligning its business objectives with social and environmental expectations. Rachinger *et al.* (2018) highlight that, in an environment of increasing demands for social responsibility and sustainability, companies with innovative business models are better able to strengthen their resilience and responsiveness to environmental changes while maximising their social impact. Thus, innovation in business models acts as a moderating factor that enhances companies' capacity to transform their business environment and seize opportunities for social innovation (Weerawardena *et al.*, 2021; Chandra *et al.*, 2021).

Based on this reasoning, we propose the following hypothesis:

H4. Business model innovation moderates the impact of the business environment on social innovation.

The resulting model based on this framework is shown in Figure 1.

3. Methodology

3.1 Sample and data

To test our theoretical hypotheses, we relied on secondary data from the Flash Eurobarometer 486 survey, titled "SMEs, Scale-ups, and Entrepreneurship", which was commissioned by the European Commission in 2020. This dataset provides detailed insights into the challenges and obstacles faced by European businesses, particularly with regard to their growth, adoption of sustainable practices, and integration of digital technologies. It encompasses data from all 27 European Union (EU) member states, offering a comprehensive view of various business conditions and economic contexts across Europe. The data were collected through telephone

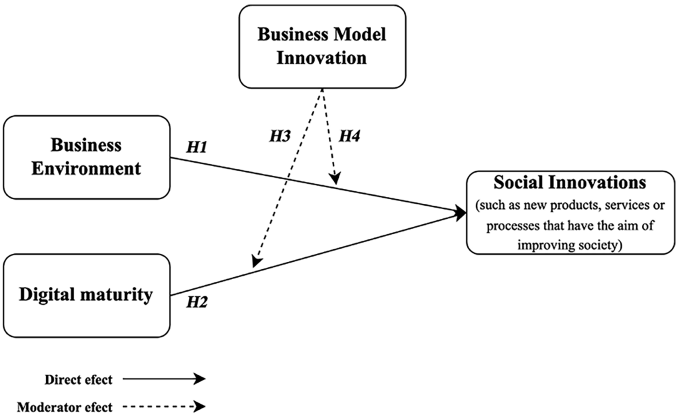

Figure 1. Conceptual model

interviews with key representatives from a diverse sample of 12,615 firms, conducted between 19 February and 5 May 2020.

The importance of the Flash Eurobarometer surveys, particularly the one focused on SMEs and innovation, is increasingly recognised in academic circles. This is attributed to their historical track record of accuracy, consistency, and reliability, further reinforced by rigorous validation processes over an extended period. These features make the Eurobarometer a valuable resource for empirical research, providing a robust foundation for testing hypotheses and deriving conclusions about the dynamic European business environment (Ardito, 2023; Suchek *et al.*, 2024).

Table 1 presents the composition of the companies in the study, reflecting a wide range of company sizes and sectors. Micro companies (1–9 employees) make up 54.8% of the sample, followed by small companies (10–49 employees) at 25.2%, and medium-sized companies (50–249 employees) at 14.8%. Larger companies (250+ employees) represent 5.2% of the sample. The firms come from a diverse set of sectors, with the largest proportion from wholesale and retail trade (27.2%), followed by manufacturing (19.4%) and construction (9.7%).

3.2 Measures

3.2.1 Dependent variable. The variable of focus in this study is Social Innovations, encompassing novel products, services, or processes aimed at societal betterment. To measure this variable, we framed the following question in our survey: "*Has your company introduced any social innovations, such as new products, services, or processes aimed at improving society, in the past 12 months?*" The response format for this question was binary, with respondents able to select either "*No*" or "*Yes*." Although the use of a single binary indicator simplifies a multidimensional construct, this operationalisation follows the structure of the Flash Eurobarometer 486 dataset, ensuring comparability across EU member states. In this sense, the binary measure captures the occurrence of social innovation but does not reflect its intensity, scope, or quality (product, process, or organisational). Consequently, the construct should be interpreted as an indicator of the presence of social innovation, rather than as a continuous or multidimensional measure of its outcomes. It is also consistent with the use of a comprehensive and original dataset at national and European levels, in which binary variables facilitate robust analysis in large-scale survey-based studies.

3.2.2 Independent variables. To evaluate the digital maturity of companies, we used a specific proxy variable in the survey: *"Has your company implemented any of the following digital technologies?"* A proxy variable is used as an indirect measure of a concept or phenomenon that may be difficult to assess directly. In this case, the presence or absence of certain digital technologies served as a proxy for the company's overall digital maturity. Respondents answered with a simple *"Yes"* or *"No,"* and the options listed covered a range of digital technologies: (1) Artificial Intelligence (AI); (2) Big Data analytics; (3) Blockchain; (4) Cloud computing; (5) High-speed digital infrastructure; (6) Robotics; and (7) Smart devices. Following the method of Arranz *et al.* (2023), we created a cumulative index named *DIGITAL*, which aggregates these seven categories of digital technologies. This index allows us to evaluate digital maturity by counting the presence or absence of each technology, providing a clear and quantitative view of the level of technological adoption (Queiroz *et al.*, 2022). This variable operationalises digital maturity through technological adoption, capturing its breadth rather than full integration or cultural alignment.

Using the approach defined by Mitropoulos *et al.* (2023), we assessed the business environment with a question regarding overall business environment dynamics. This measure included individual items, such as access to public and private financing, evaluating the ease with which companies can obtain capital; quality of business support services, measuring the efficiency of support provided by public and private agents; opportunities for collaboration with business partners, covering interactions with other companies, the public sector, and educational institutions; availability of qualified personnel, considering the ease of finding

Table 1. Firms characteristics

		N	%
Country	France	503	3.1
	Bulgaria	503	3.1
	Portugal	502	3.1
	Greece	502	3.1
	Sweden	501	3.1
	Slovenia	501	3.1
	Estonia	501	3.1
	Spain	500	3.1
	Slovakia	500	3.1
	Romania	500	3.1
	Netherlands	500	3.1
	Malta	500	3.1
	Lithuania	500	3.1
	Latvia	500	3.1
	Italy	500	3.1
	Ireland	500	3.1
	Hungary	500	3.1
	Germany	500	3.1
	Finland	500	3.1
	Denmark	500	3.1
	Cyprus Republic	500	3.1
	Croatia	500	3.1
	Belgium	500	3.1
	Austria	500	3.1
	Poland	201	1.2
	Czech Republic	201	1.2
	Luxembourg	200	1.2
SECTOR OF ACTIVITY (NACE) – SECTIONS	G – Wholesale and retail trade. repair of motor vehicles and motorcycle	3,433	27.2
	C – Manufacturing	2,447	19.4
	M – Professional. scientific and technical activities	1,231	9.8
	F – Construction	1,222	9.7
	H – Transportation and storage	762	6
	I – Accommodation and food service activities	712	5.6
	N – Administrative and support service activities	539	4.3
	J – Information and communication	492	3.9
	Q – Human health and social work activities	469	3.7
	P – Education	314	2.5
	L – Real estate activities	300	2.4
	K – Financial and insurance activities	275	2.2
	R – Arts, entertainment, and recreation	184	1.5
	E – Water supply, waste management/remediation active	130	1
	D – Electricity, gas, steam, and air conditioning supply	70	0.6
	B – Mining and quarrying	35	0.3
Employees	1 to 9 employees	6,918	54.8
	10 to 49 employees	3,174	25.2
	50 to 249 employees	1,865	14.8
	250 employees or more	658	5.2

Note(s): NACE, Statistical Classification of Economic Activities in the European Community

employees with the necessary technical and managerial skills; support available to companies pursuing sustainable practices; effectiveness of the legal and administrative environment; and quality of business infrastructure, including offices and internet connectivity. These items were rated on a scale from *"Very bad"* to *"Very good,"* allowing for a detailed, quantitative

analysis of various factors influencing the business environment. To determine the overall quality of the business environment, a score was calculated using principal component analysis, resulting in a single factor with an eigenvalue greater than 1, as confirmed by a Kaiser–Meyer–Olkin Measure of Sampling Adequacy (KMO = 0.837). Additionally, Bartlett's Test of Sphericity was significant at $p < 0.001$, indicating substantial correlation among the variables and validating the concentration of variance in a single factor representative of general business conditions.

3.2.3 Moderating variable. The first moderating variable is related to the adoption of a new business model. To measure this variable, we used a specific question in the questionnaire: *"In the last 12 months, has your company implemented a new management structure or adopted a different business model?"* Responses were binary, i.e. respondents could choose either *"No"* or *"Yes."* Although the item refers to a new business model, it is conceptually interpreted as BMI, in line with the literature on value creation and reconfiguration (Teece, 2010; Foss and Saebi, 2017). This binary operationalisation captures the occurrence of organisational change but does not distinguish between incremental adjustments and radical redesigns, potentially masking heterogeneity in strategic transformation. Nevertheless, this approach is consistent with the structure of the Flash Eurobarometer 486 and is appropriate for a large and original cross-country dataset, enabling robust and comparable analyses across firms and countries.

3.2.4 Control variables. Several control variables were included to improve the predictive power of the model. These variables include the age of the company (AGE) (transformed using the natural logarithm), the size of the company in terms of the number of employees (EMPL) (also transformed using the natural logarithm), and a set of dummy variables to control for the industrial sector.

3.3 Data analysis

To evaluate our hypotheses, we employed multivariate logistic regression analysis, as the dependent variable, social innovation, is binary (0 = no, 1 = yes), indicating whether a company introduced a social innovation. Logistic regression is appropriate for modelling the probability of a binary outcome, allowing us to estimate the likelihood of a company adopting social innovation based on the independent variables considered. The logistic regression function estimates the probability of a given observation j ($j = 1, \ldots, n$) of the dependent variable occurring, expressed as follows:

$$p_{ij} = \frac{1}{1 + e^{-X\beta}}$$

where p is the vector of estimated probabilities, X is the matrix of independent variables, and β is the vector of logistic regression coefficients (Cameron and Trivedi, 2005). As we used a logistic model, the Odds Ratio (OR) was also estimated, representing the likelihood of social innovation adoption in response to variations in the independent variables.

We structured three distinct models to analyse the relationship between digital maturity, business environment, and social innovations (see Appendix Table A1 for model validation). Model 1 primarily focused on control variables, including the age of the company (AGE), size of the company in terms of number of employees (EMPL), and turnover (TURNOVER)—all transformed using the natural logarithm—and a set of dummy variables to account for variations across industrial sectors. Model 2 expanded on Model 1 by incorporating independent variables alongside the control variables. Model 3 was the most comprehensive, including control variables, independent variables, moderating variables, and interaction effects. Interaction effects were explored by examining the multiplicative relationships between these variables. This model aimed to provide a nuanced understanding of how various factors interact and influence the propensity of companies to engage in social innovations. Interaction variables were calculated by multiplying the values of the relevant variables.

In all models estimated in this study, we used data from a sample of 11,866 companies. Because interaction effects in non-linear models cannot be directly interpreted from regression coefficients, we also computed marginal effects and predicted probabilities. This approach allows a clearer interpretation of the moderating relationships by visualising the change in the predicted probability of social innovation across levels of digital maturity and BMI.

As the data were collected across multiple countries, violating the assumption of independence of observations within each country, we used clustered robust standard errors, with country as the clustering variable. Therefore, we did not include dummy variables associated with the company's country as control variables. Additionally, we checked for potential multicollinearity among the variables used in the analysis by examining correlations between them and computing the Variance Inflation Factor (VIF).

4. Results

Table 2 presents the descriptive statistics and correlation matrix for the variables used in this study. The sample shows that 16% of firms had implemented new business models, indicating a moderate level of innovation in business structuring. Additionally, 9% of the companies belonged to a larger group of enterprises, suggesting some degree of integration and potential access to shared resources or support. Furthermore, 18% of companies reported implementing a social innovation within the last 12 months, reflecting an emphasis on creating products, services, or processes aimed at social improvement. Regarding correlations, company size (SIZE) is moderately correlated with digital maturity (DIGITAL) ($r = 0.30$) and with belonging to a business group (GROUP) ($r = 0.24$). Digital maturity is also moderately correlated with BMI ($r = 0.20$), while the business environment (ENV) shows correlations of 0.17 with both company size and digital maturity, suggesting moderate relationships among these factors. All VIF values were below 5, indicating no multicollinearity concerns.

The estimated logistic regression models (Model 1, Model 2, and Model 3) that test the hypotheses developed in this study are presented in Table 3. For the control variables, several showed statistically significant effects on social innovation. In particular, the number of employees (EMPL) positively influences social innovation in Model 1 (OR = 1.15, $p < 0.05$), indicating that larger companies are more likely to engage in social innovation. Among industry sectors, Water Supply, Sewerage, Waste Management, and Remediation Activities (E) display a strong positive effect in Model 1 (OR = 4.24, $p < 0.05$), while the Construction sector (F) demonstrates a positive influence in both Model 2 (OR = 1.14, $p < 0.05$) and Model 3 (OR = 1.18, $p < 0.05$). Education (P) significantly impacts social innovation across all models: Model 1 (OR = 4.68, $p < 0.05$), Model 2 (OR = 5.17, $p < 0.05$), and Model 3 (OR = 4.69, $p < 0.05$). Human Health and Social Work Activities (Q) are also significantly associated with social innovation in all models, showing the strongest effect in Model 2 (OR = 5.21, $p < 0.05$). Similarly, Arts, Entertainment, and Recreation demonstrate a significant propensity for social innovation, with odds ratios of 3.73 in Model 1 ($p < 0.05$), 4.20 in Model 2 ($p < 0.05$), and 4.38 in Model 3 ($p < 0.05$).

Table 2. Descriptive statistics and matrix correlation (VIF in diagonal)

	Mean ± SD	Range	1	2	3	4	5	6	7
(1) AGE, ln(years)	2.95 ± 0.8	0–5.14	*3.45*						
(2) SIZE, ln(workers)	2.42 ± 1.76	0–9.21	0.27	*2.89*					
(3) DIGITAL	1.39 ± 1.42	0–7	0.07	0.30	*1.56*				
(4) ENV	0.00 ± 1.00	−2.29–4.06	0.03	0.17	0.17	*4.57*			
(5) BMI (%)	0.16 ± 0.36	0–1	0.01	0.13	0.20	0.07	*4.35*		
(6) GROUP (%)	0.09 ± 0.29	0–1	0.06	0.24	0.19	0.08	0.10	*3.14*	
(7) SOCIAL (%)	0.18 ± 0.39	0–1	0.02	0.10	0.22	0.10	0.20	0.03	*2.96*

Note(s): SD – Standard Deviation; Range – Minimum/Maximum

Table 3. Results for logistic models, OR (CI95%)

	Model 1	Model 2	Model 3
AGE	1.04 [0.82–1.33]	1.04 [0.8–1.35]	1.08 [0.85–1.36]
EMPL	1.15 [1.13–1.17]*	1.05 [0.99–1.12]	1.07 [0.97–1.18]
TURNOVER	1 [0.97–1.02]	1 [0.98–1.02]	1.00 [0.99–1.02]
B – Mining and quarrying	4.61 [0.17–121.68]	8.97 [0.35–232.56]	5.59 [0.53–59.32]
E – Water supply.sewerage.waste management/remediation activities	4.24 [3.64–4.93]*	4.56 [3.43–6.04]*	4.34 [3.28–5.73]
F – Construction	0.85 [0.64–1.15]	1.14 [1.04–1.24]*	1.18 [1.01–1.39]*
G – Wholesale and retail trade. repair of motor vehicles and motocycle	1.2 [0.78–1.83]	1.33 [0.82–2.15]	1.3 [0.75–2.26]
H – Transportation and storage	1.33 [0.68–2.61]	1.62 [0.75–3.53]	1.59 [0.61–4.16]
I – Accommodation and food service activities	1.73 [0.71–4.19]	2.31 [0.89–5.99]	2.28 [0.97–5.37]
J – Information and communication	1.76 [1.03–3.01]*	1.56 [0.84–2.89]	1.66 [0.94–2.94]
K – Financial and insurance activities	0.73 [0.38–1.41]	0.73 [0.39–1.38]	0.67 [0.41–1.11]
L – Real estate activities	1.59 [0.9–2.84]	1.69 [0.93–3.08]	1.85 [0.86–3.95]
M – Professional. scientific and technical activities	0.78 [0.46–1.33]	0.78 [0.47–1.29]	0.72 [0.41–1.27]
N – Administrative and support service activities	1.01 [0.7–1.44]	1.19 [0.76–1.86]	1.21 [0.64–2.3]
P – Education	4.68 [1.89–11.57]*	5.17 [1.9–14.11]*	4.69 [1.46–15.01]*
Q – Human health and social work activities	3.94 [2.76–5.62]*	5.21 [2.87–9.46]*	4.82 [2.4–9.65]*
R – Arts. entertainment and recreation	3.73 [1.7–8.18]*	4.2 [1.73–10.19]*	4.38 [1.84–10.44]*
ENV (H1)		1.12 [1.03–1.29]*	1.07 [0.93–1.20]
DIGITAL (H2)		1.33 [1.19–1.49]*	1.44 [1.24–1.66]*
BMI			3.47 [2.26–5.35]*
GROUP			0.89 [0.35–2.25]
BMI × DIG (H3)			0.8 [0.69–0.92]*
BMI × ENV (H4)			0.81 [0.66–1.01]
Constant			0.04 [0.04–0.05]

Note(s): OR – Odds Ratio; CI – Confidence Interval; *$p < 0.05$; **$p < 0.01$

Concerning the hypotheses, Hypothesis 1 proposed that the business environment (ENV) would positively influence social innovation. In Model 2, the business environment shows a positive relationship with social innovation (OR = 1.12, $p < 0.05$), indicating that a supportive business environment increases the likelihood of firms engaging in social innovation. However, in Model 3, this effect is not statistically significant (OR = 1.07, $p \geq 0.05$), suggesting that the impact of the business environment diminishes as model complexity increases.

Hypothesis 2, which addresses the effect of digital maturity (DIGITAL) on social innovation, is supported across Model 2 and Model 3. Higher levels of digital maturity consistently enhance social innovation, with odds ratios of 1.33 ($p < 0.05$) in Model 2 and 1.44 ($p < 0.05$) in Model 3, reflecting a strong and stable positive influence across these models.

For Hypothesis 3, examining the interaction between BMI and digital maturity (DIGITAL), Model 3 reveals a negative moderating effect on social innovation (OR = 0.80, $p < 0.05$). As illustrated in Figure 2, while digital maturity generally increases the probability of social innovation for all firms, the slope is less pronounced for those that have implemented BMI. This confirms that BMI weakens the positive effect of digital maturity on social innovation, consistent with the hypothesised paradoxical moderation. The negative interaction aligns with ambidexterity tensions, in which BMI requires resource reallocation that can disrupt the alignment between digital capabilities and social objectives (Smith and Lewis, 2011), or transition costs in hybrid organisations (Andries *et al.*, 2013). Therefore, the combined effect

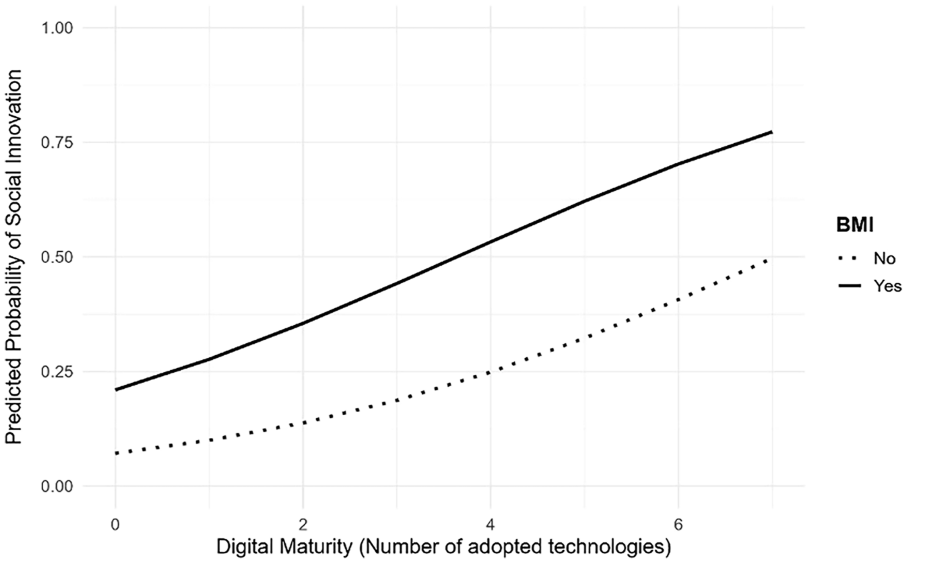

Figure 2. Marginal effects of digital maturity and business model innovation (BMI) on the predicted probability of social innovation

of BMI and digital maturity is not determinative for social innovation. In firms with innovative business models, social innovation appears to be primarily driven by the BMI itself (OR = 3.47, $p < 0.05$), whereas digital maturity plays a more influential role in companies without such business model innovations.

Hypothesis 4 proposed an interaction effect between BMI and the business environment (ENV). In Model 3, this interaction was not statistically significant (OR = 0.81, $p \geq 0.05$), indicating that BMI does not significantly alter the relationship between the business environment and social innovation in the present sample.

Overall, the results demonstrate a positive influence of digital maturity and the business environment on social innovation, highlighting their importance as key drivers. However, the combined effect of BMI with digital maturity appears less straightforward, as it may dampen rather than amplify the positive impact of digital capabilities on social innovation. Furthermore, the influence of belonging to a business group on social innovation is comparatively limited within these models, suggesting that internal and strategic factors play a more critical role than mere group affiliation. Table 4 presents a summary of the hypotheses alongside their respective validation outcomes.

Table 4. Results obtained for the proposed hypotheses

Hypotheses	Results
H1: The business environment positively influences the social innovation of products, services or processes aimed at improving society	Supported
H2: Digital maturity has a positive influence on the social innovation of products, services or processes aimed at improving society	Supported
H3: Business Model Innovation has a moderating effect on the impact of digital maturity on social innovation	Supported
H4: Business model innovation has a moderating effect on the impact of the business environment on social innovation	Not Supported

5. Discussion

This study analysed the influence of digital maturity and the business environment on social innovation, and the moderating role of BMI. Using data from Flash Eurobarometer 486, we partially validated our hypotheses and confirmed that both factors contribute to driving social innovation. However, BMI negatively moderates the relationship between digital maturity and social innovation, challenging the idea of a linear complementarity between capabilities. These findings enrich frameworks such as the RBV, open innovation, business sustainability, and social innovation systems by integrating technological, contextual, and strategic dimensions.

Previous research has identified digital maturity as an essential driver of business innovation due to its ability to adapt in dynamic environments (Bharadwaj *et al.*, 2013). For example, Porter and Kramer (2011) introduce the concept of shared value to show how integrating economic and social objectives drives innovation. Similarly, Zahra and Wright (2015) argue that social entrepreneurship arises from the interaction between internal capabilities and external institutional conditions, requiring a systemic framework to generate social value. Consequently, this study extends these findings to the field of social innovation, demonstrating that digital maturity and the business environment interact in complex ways to enhance social outcomes, reinforcing the need for integrated approaches that consider internal resources and structural factors.

Regarding our first research question concerning the impact of the business environment on social innovation, the results reveal that although a favourable business environment enhances social innovation in partial analyses, its effect disappears when controlling for internal capabilities such as organisational structure and digital strategy. This suggests that, to absorb external stimuli, companies require robust internal resources (Chesbrough, 2003), casting doubt on the notion of a direct relationship. Thus, we expand on the proposals of Porter and Kramer (2011) and Rao-Nicholson *et al.* (2017), showing that shared value arises only when institutional conditions and internal strategic capabilities converge.

The results confirm that digital maturity has a positive and robust effect on social innovation, reinforcing the RBV (Barney, 1991; Peteraf, 1993). By strategically integrating digital technologies (Westerman *et al.*, 2014), companies gain a unique resource for detecting social opportunities and co-creating scalable solutions (Qureshi *et al.*, 2021; Millard and Carpenter, 2014). Furthermore, beyond improving operational efficiency, digital maturity fosters innovative practices and strengthens organisational adaptability in the face of complex social challenges (Berman, 2012; Ritala *et al.*, 2021; Schiavone *et al.*, 2021; Foroudi *et al.*, 2021). In short, these findings suggest that digital maturity is a critical capability for aligning business objectives with social goals, especially in knowledge-based and relational network sectors. However, it should be noted that the measure of digital maturity adopted in this study captures the technological dimension of adoption rather than the full organisational integration of digital capabilities. Thus, the results reflect firms' technological readiness, while future research should incorporate more comprehensive measures, including integration and strategic alignment.

In relation to our second research question on the moderating role of BMI, we confirm that, as argued by Teece (2010) and Inigo *et al.* (2020), BMI articulates economic, social, and environmental objectives in a coherent framework, and its direct effect on social innovation is positive and robust. However, when exploring its moderating role alongside digital maturity, a negative moderation emerges, questioning the assumed automatic complementarity between capabilities. In certain configurations, the simultaneity of technological and structural transformations can cause operational tensions or conflicts of approach, which is especially critical in hybrid organisations that pursue commercial and social goals (Battilana and Dorado, 2010; Alberti and Varon Garrido, 2017). Drawing on paradox theory, this "digital paradox" reflects ambidexterity challenges: firms must balance exploitation (digital efficiency) with exploration (social value via BMI), often leading to resource overload or misaligned priorities (Smith and Lewis, 2011). Empirical mechanisms include transition costs from BMI redesign

(e.g. reconfiguring value chains; Andries *et al.*, 2013) and institutional ambiguity when digital signals conflict with social norms (Paolella and Durand, 2016). Thus, while the RBV views digital maturity as a stable asset, DCT reveals reconfiguration demands that BMI exacerbates without strategic alignment. Therefore, maximising social innovation requires fine-tuning digital maturity and redesigning the business model, avoiding counterproductive overlaps and prioritising strategic coherence.

These results also indicate a risk of mission displacement when digital capabilities are geared towards efficiency or growth, while the business model prioritises financial metrics, potentially diluting the social focus (Santos *et al.*, 2015; Young and Salamon, 2002). Furthermore, business model redesign requires structural changes and new relationships with stakeholders that demand a high investment of strategic resources (Achtenhagen *et al.*, 2013), which can divert attention and limit the deployment of digital maturity for social purposes.

Tensions intensify when BMI is radical, as profound transformations in the value proposition, revenue logic, or governance can misalign key capabilities and nullify the effect of digital maturity (Inigo *et al.*, 2020; Teece, 2010). Similarly, the simultaneity of organisational logics sends contradictory signals to external institutions and actors, generating ambiguity that erodes legitimacy and attenuates the social impact of the digital capabilities deployed by the organisation, in line with the arguments of Paolella and Durand (2016).

The heterogeneity of social organisations further nuances the interaction between BMI and digital maturity. For example, in entities with a historically social innovation-oriented model, including frugal or analogue approaches, social impact is achieved without advanced technology (Hossain, 2021), rendering digital maturity less critical or marginal in its contribution. Recognising these contexts is therefore key to defining coherent strategies for sustainable social innovation.

Sector-specific insights reinforce this point. In education and health, sectors that show strong control effects in the results, relational networks tend to dominate. In such contexts, BMI may become counterproductive if it shifts the focus from community co-creation to profitability. To mitigate these tensions, managers should prioritise digital upgrades before implementing BMI, for example by piloting hybrid models in low-risk units.

Regarding the role of BMI in the relationship between the business environment and social innovation, the empirical results did not show statistically significant effects. This suggests that, in our context, environmental conditions exert their influence regardless of the configuration of the business model. This is consistent with studies that attribute social innovation mainly to institutional pressures, technological opportunities, and available resources (Presenza *et al.*, 2020; Ievoli *et al.*, 2019). In this sense, the business model could operate as an execution platform, but not as a factor that intensifies or changes the direction of the link between environment and social innovative behaviour. This non-significance may reflect measurement limits but also institutional stickiness: BMI acts as an execution tool rather than an amplifier in stable EU environments (Scott, 2014), suggesting boundary conditions for future multilevel analysis.

Including structural and contextual controls allowed us to isolate the effect of digital maturity and BMI on social innovation. Specifically, organisational size is positively associated (Marom *et al.*, 2019; Messeni Petruzzelli and Ardito, 2019; Mota Veiga *et al.*, 2024), suggesting that access to resources strengthens social capacity. Conversely, neither seniority nor turnover showed significance, indicating that track record and financial performance are insufficient without accompanying strategy. Likewise, the education and health sectors stand out for their proximity to social problems and relational networks, aligning with Schröer (2021) on their greater innovative dynamism, implying targeted policies for these sectors to leverage digital maturity without BMI overload.

In short, the results support the need for an integrated approach that combines the availability of resources (internal and external) with the organisational capacity to transform them into socially valuable solutions. Therefore, companies must align digital maturity, internal structure, and relationship with the environment in synergistic strategies. In turn,

policies to support innovation must transcend structural incentives and promote digital capabilities, organisational learning, and strategic orientation towards social goals.

5.1 Theoretical implications

This study makes three main theoretical contributions to the literature on social innovation by consolidating a systemic framework that integrates and enriches various theoretical perspectives.

First, the study contributes to the literature by integrating the RBV and DCT to explain the role of digital maturity in social innovation. In line with the RBV, the results confirm that digital maturity can be understood as a valuable, rare, and inimitable strategic resource that drives social innovation (Barney, 1991; Bharadwaj *et al.*, 2013). However, and here lies a key contribution, DCT qualifies this view by showing that the mere possession of digital resources does not guarantee their effectiveness; rather, their impact depends on the ability of organisations to integrate and reconfigure them appropriately in dynamic environments (Teece, 2010; Sirmon *et al.*, 2007). This perspective provides an empirical explanation for the negative interaction observed between digital maturity and innovation in business models, highlighting the tensions associated with simultaneous technological and structural transformation processes.

Second, the study reinterprets the role of the business and institutional environment in social innovation in light of the internal capabilities of organisations. Although previous research has highlighted that a collaborative, open, and institutionally supportive environment can facilitate innovation processes (Chesbrough, 2003; West and Bogers, 2014), our results show that its effect is neither direct nor automatic. Rather, it critically depends on the existence of internal capabilities—such as digital maturity—that enable the absorption, channelling, and activation of this environment towards social innovation (Rao-Nicholson *et al.*, 2017). Similarly, this pattern extends to social capital, traditionally considered a key driver of innovation (Putnam, 2000), which, in the absence of sufficient technological or strategic capabilities, shows limited or marginal effects (Adler and Kwon, 2002; Gasparin *et al.*, 2021).

Third, based on the integration of the above findings, the study makes a systemic and integrative contribution by proposing that social innovation cannot be explained exclusively by contextual factors or isolated internal resources. In line with the neo-institutional approach (Scott, 2014; Bonnedahl *et al.*, 2022), the results show that regulatory or coercive pressures do not generate social innovation on their own, but require organisational structures and internal strategies that deliberately activate them. Thus, a holistic approach is proposed in which social innovation emerges from the dynamic interaction between technological resources, institutional frameworks, and organisational strategies, reinforcing a non-deterministic and multilevel view of the phenomenon (Zahra *et al.*, 2009; Cajaiba-Santana, 2014; Howaldt and Schwarz, 2010; Carayannis *et al.*, 2021).

5.2 Practical implications

The findings confirm that fostering social innovation requires an integrated vision of business policies and strategies. In particular, authorities must design frameworks that improve the business environment, facilitating collaborative networks, supporting strategic alliances, and promoting organisational cultures geared towards innovation and social responsibility. These frameworks enhance firms' innovative capacity and the diffusion of socially oriented business practices.

Likewise, digital maturity is revealed as an essential facilitator for social innovation. Therefore, companies must invest in the adoption and integration of digital technologies, from training in digital skills to the implementation of platforms that improve operational efficiency and enable projects with social impact. Such investments help align technological transformation with societal needs, reinforcing firms' ability to deliver inclusive and sustainable outcomes.

In addition, the specific findings on the interaction between digital maturity and BMI have direct implications for managers and policy makers. For managers, the results suggest that digital and business model changes should not occur simultaneously but rather through staged integration. In the education and health sectors, managers could first digitalise relational processes, such as patient or student engagement systems, before redesigning revenue or governance models. This sequence allows organisational learning and cultural adaptation before deeper structural change, reducing the risk of resource strain and mission drift. Managers are also encouraged to establish cross-functional digital–social innovation teams to ensure that digital initiatives explicitly support social objectives rather than operate in isolation.

For policy makers, the findings highlight the need for careful sequencing and coordination of digital and business model policies. Public programmes should offer targeted digital capability grants (for example, data and AI adoption or e-learning infrastructure) before supporting broader BMI, especially in small and medium-sized enterprises and mission-driven sectors such as education and health. This approach helps organisations absorb technological change effectively. Monitoring frameworks should include social outcome indicators (such as employment inclusion and digital accessibility) to verify that the development of digital maturity contributes to social value creation. This approach aligns with EU initiatives such as the Digital Europe Programme (official EU programme 2021–2027, established by Regulation EU 2021/694) and the Social Economy Action Plan (European Commission plan horizon 2030), promoting competitiveness and inclusion.

Although the combination of digital maturity and BMI does not further enhance social innovation, BMI alone has a direct and substantial effect. Therefore, it should be considered an independent driver, as redesigning value propositions, processes, and capture mechanisms reinforces organisational agility and responsiveness to social challenges. Firms should assess ambidexterity risks before BMI implementation—for instance, through digital–social alignment audits to ensure that digital resources support social objectives and prevent overload in resource-constrained small and medium-sized enterprises (Smith and Lewis, 2011).

5.3 Limitations and future lines of research

Given the methodology used in this study, several limitations can be identified, which in turn open up avenues for future research. First, the use of secondary data from Flash Eurobarometer 486 imposes certain restrictions. In particular, this survey was not specifically designed to capture constructs such as social innovation, digital maturity, or BMI, which limits the depth and accuracy of the variables analysed. For example, some key variables, such as the business environment, were operationalised in an aggregate or dichotomous manner, which may have reduced their sensitivity to capture complex effects such as moderating relationships. Similarly, in the case of social innovation, measuring it using a binary indicator allows the identification of socially oriented initiatives but does not capture differences in the magnitude, diversity, or depth of the social impact generated. Consequently, future studies could benefit from the collection of primary data that allows for more specific questions to be asked, as well as the incorporation of validated scales that capture the nuances of these phenomena with greater conceptual richness.

Furthermore, the analysis was conducted on a multinational sample of companies from different European Union countries, which introduces institutional, cultural, and regulatory heterogeneity. Although this has been partially controlled for by clustering standard errors by country, future research could design multilevel studies that explicitly analyse how national policies, legal frameworks, and institutional support structures condition the deployment of social innovation. Future research should employ validated multi-item scales or mixed-method approaches to capture the multidimensional nature of social innovation, distinguishing, for instance, between incremental, systemic, and transformative innovations (Cajaiba-Santana, 2014; Howaldt and Schwarz, 2010).

Another limitation concerns the operationalisation of digital maturity. Although the index based on technology adoption is consistent with prior Eurobarometer studies, it does not fully capture the organisational, strategic, and cultural dimensions of maturity. Future research should develop multidimensional indices that combine technological adoption, integration, and organisational learning processes to better represent digital maturity as a dynamic capability.

BMI was measured through a binary indicator, which allows changes in the company's organisational structure or business model to be identified, but does not capture their intensity, scope, or quality, nor does it distinguish between incremental innovations and radical transformations. Future studies should employ multidimensional or scaled measures (Foss and Saebi, 2017; Inigo *et al.*, 2020) to capture the intensity and nature of business model change.

Finally, although logistic regression models with interaction effects have been useful for exploring relationships between key variables, this approach may oversimplify complex organisational phenomena. Therefore, the incorporation of advanced techniques, such as structural equation models or machine learning approaches, would allow for a better understanding of the interdependencies, non-linearities, and multiple configurations that characterise the relationship between digital capabilities, the organisational environment, and social innovation. Qualitative case studies could also illuminate the organisational tensions underlying the observed paradox.

6. Conclusion

This study provides empirical evidence on how digital maturity and the business environment influence social innovation, highlighting the non-linear role that BMI can play in moderating these relationships. In particular, the results show that digital maturity acts as a key strategic resource for generating social impact, while the influence of the business environment seems to depend on the internal configuration of the organisation. The findings also confirm that business model redesign promotes social innovation, although its interaction with technological capabilities can generate tensions, strategic conflicts, or neutral effects, depending on the organisational context.

Therefore, this work contributes to enriching approaches such as the RBV and DCT, as well as conceptual frameworks linked to social capital, open innovation, and the neo-institutional perspective, by demonstrating that the generation of social innovation does not depend exclusively on structural or technological factors, but on its dynamic interaction with internal capabilities, organisational models, and institutional conditions. This reinforces the need for a systemic approach that integrates technological, strategic, and contextual dimensions in the analysis of innovative behaviour oriented towards social impact.

Finally, the findings have implications for researchers, managers, and public policy makers. To foster more socially innovative organisations, it is essential to design strategies that align digital maturity, business model, and social orientation, without assuming automatic synergies between these elements. In complex environments, social innovation requires both capabilities and organisational coherence.

(The Appendix follows overleaf)

Appendix

Table A1. Cross-validation (10 Folds) of the models

	Model 1		Model 2		Model 3	
	Accuracy	AUC	Accuracy	AUC	Accuracy	AUC
Fold01	0.543	0.613	0.637	0.697	0.640	0.725
Fold02	0.705	0.611	0.718	0.692	0.650	0.724
Fold03	0.595	0.575	0.670	0.662	0.664	0.718
Fold04	0.740	0.604	0.692	0.670	0.704	0.681
Fold05	0.647	0.559	0.627	0.693	0.657	0.731
Fold06	0.519	0.605	0.680	0.721	0.715	0.706
Fold07	0.613	0.579	0.557	0.661	0.619	0.705
Fold08	0.577	0.576	0.698	0.691	0.610	0.701
Fold09	0.495	0.606	0.618	0.704	0.697	0.734
Fold10	0.682	0.635	0.547	0.690	0.684	0.761
Mean	0.612	0.596	0.644	0.688	0.664	0.719
SD	0.081	0.023	0.058	0.019	0.036	0.022

Note(s): AUC, area under the curve

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Further reading

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