

Research Article

The key role of innovation and organizational resilience in improving business performance: A mixed-methods approach

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ABSTRACT

An uncertain and complex economic environment requires companies to act quickly and reinvent their business strategies. Innovation has emerged as a strategic imperative to adapt to market changes and remain competitive, while resilience has gained attention as essential for organizations to respond successfully to external environmental pressures. Despite these strategic factors' importance in unstable environments, little empirical research has analyzed them. Drawing on dynamic capabilities' theory, our study examines the role of service innovation and organizational resilience in enhancing business performance using a sequential two-stage mixed-methods approach. First, a quantitative study was conducted to test the proposed research model using structural equation modelling (SEM) analysis with a sample of 343 service companies in Spain. Second, a qualitative analysis was performed with 12 interviews with managers to provide additional insights and a detailed understanding of the phenomenon. The results confirm innovation and resilience as key dynamic capabilities to address a changing business landscape and remain competitive. Our findings also reveal the strategic importance of digital tools (social media platforms) and external networks as drivers of service innovation. Managers can use these findings to leverage social media to engage in collaborative networks, enhance innovation and resilience, and succeed in turbulent markets.

1. Introduction

Firms recently operate in a chaotic business environment where they must continuously overcome new challenges to compete and survive (Do et al., 2022). In a complex economic context that combines pressing inflation, market volatility, associated uncertainty, rapid technological advancements, and rapid changes in customers' needs (Forliano et al., 2023; Skare et al., 2023), innovation becomes a key strategy for companies to survive and compete in the face of external disruptions (Li et al., 2021). Additionally, the digital age, inaugurated by the shift to a digital business world (Kraus et al., 2022) and accelerated by the pandemic, has imposed a strategic imperative to reshape corporate strategy, business models, and innovation practices to ensure competitiveness.

Digital technologies have become crucial to fostering innovative services, transforming the way companies do business and create value in this changing business landscape (Dwivedi et al., 2022). The literature has shown how the appropriate strategic use of digital technologies can lead companies to improved competitiveness and performance

(Papadopoulos et al., 2020). Platforms such as social media (SM) have emerged as key digital tools to promote collaboration with external actors, enabling firms to collect valuable market information to support innovation activities (Muninger et al., 2022). To address emerging challenges, risk, and turbulence, firms must anticipate and adjust to new trends by developing innovative products and services. Service innovation has thus become an essential—even mandatory—factor in fostering companies' ability to adapt to changes in business environments (Heinonen & Strandvik, 2021). Evidence shows that digitalization and technological solutions have been critical in driving organizations' innovativeness in coping with recent crises (Forliano et al., 2023). Although research on the topic is growing, more knowledge is needed on the processes by which firms can use these tools to foster collaboration networks and innovation (Muninger et al., 2022).

The variable organizational resilience has gained momentum in complicated today's business contexts (Hollands et al., 2023). Helping firms act to deal promptly with challenging risk, resilience is critical for organizational success (Duchek et al., 2020). Defined as a company's ability to respond effectively to environmental disruptions and

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transform itself to emerge stronger from a challenging situation (Forliano et al., 2023; Lengnick-Hall et al., 2011), resilience is a multifaceted concept that reflects businesses' ability to foresee, confront, and benefit from sudden disruptive change to survive, grow, and flourish (Papa-geannidis et al., 2020). Digital technologies and innovation have been recognized as important drivers of firms' resilience in turbulent external conditions (Nielsen et al., 2023). Digital technologies have emerged as key strategic tools, facilitating the rapid updating of business strategies and providing companies with a protective shield against sudden disruptions (Dwivedi et al., 2020). Innovative firms' flexibility and adaptive thinking lead firms to achieve resilience and respond successfully to external environmental pressures (Li et al., 2021). Recent literature stresses how use of digital tools, innovation, and organizational resilience have emerged as key strategic initiatives to compete successfully in today's changing environment (Do et al., 2022; Forliano et al., 2023; Xie et al., 2022).

Although research on these topics is increasing, little empirical evidence has confirmed effective paths to implementation. Additional studies are needed to analyze how digital technologies (e.g., SM) drive service innovation (So et al., 2023) and what role key firm capabilities such as innovation play in fostering organizational resilience (Melian-Alzola et al., 2020). Research should advance knowledge on this topic to better understand how firms can become more resilient and innovative (Xie et al., 2022) and explore its positive implications for performance in unstable environments (Do et al., 2022).

To fill this gap, our study draws on dynamic capabilities theory (hereafter, DC theory), to explore the linkages among SM, innovation, resilience, and value creation in the digital context. To this end, our specific research objectives are: (1) to analyze the impact of service innovation and organizational resilience on business performance, and (2) to explore the main drivers of service innovation and organizational resilience in a digital context. To achieve these goals, a mixed methods approach was used, combining quantitative and qualitative analysis. The findings from the qualitative study both help to corroborate the results of the quantitative analysis and provide additional insights into these issues.

The paper is organized as follows. Following this introduction, Section 2 reviews the relevant literature. Section 3 explains the research design. Section 4 focuses on the quantitative study, including hypothesis development, research method, and main results. Section 5 describes the qualitative study and highlights the main findings. Section 6 discusses the results, implications, limitations, and future research lines. Finally, Section 7 presents the conclusions.

2. Literature review

2.1. Dynamic capabilities view

Central to DC theory is the dynamic essence of organizational capabilities and resources (Teece et al., 1997)—that is, an enterprise's competence to integrate, build, and reshape internal and external competences to cope with rapidly shifting environments (Teece, 2007). DC theory is an ideal theoretical lens to examine the firm's value creation process in a digital context characterized by rapid and profound structural change (Garrido-Moreno et al., 2020). DC theory provides an effective strategic management methodology to explain the mechanisms by which organizations achieve and sustain competitive advantage. Because it corrects for the static nature of the resource-based view, it has been widely adopted in a service context (Lütjen et al., 2019). According to DC theory, a company's ability to deploy its resources to adapt to the dynamic environment leads to sustained competitive advantage (Barney, 1991; Eisenhardt & Martin, 2000). DC theory addresses the resource-based view's shortcomings in comprehending how entities amalgamate resources and capabilities within a dynamic context.

Teece et al., (1997, p. 516) identified dynamic capabilities as "the firm's ability to integrate, build and reconfigure internal and external

competences to address rapidly changing environments." Dynamic capabilities thus reflect a firm's ability to renew its competences continuously to respond rapidly to changing environmental conditions (Junaid et al., 2023). DC refers to the organization's ability to adapt and respond to changing environments by coordinating and integrating internal and external resources and processes (Awad & Martín-Rojas, 2023). Those capabilities have become a key concern for businesses today as they enable firms to identify, acquire and transform resources and capabilities in line with changing conditions in order to remain competitive (Ambrosini & Bowman, 2009; Teece & Pisano, 1994). These capabilities are especially important in the service sector, where market dynamics are constantly evolving. To be able to develop new services in such an unstable context, firms need to develop dynamic capabilities to foster service innovation (Kindström et al., 2013).

In changing and turbulent contexts, dynamic capabilities enable firms to reconfigure ordinary capabilities and adapt to new challenges by deploying novel capabilities (Matarazzo et al., 2021). Use of digital resources and capabilities, coupled with unwavering commitment to resilience and adaptability, enables organizations to navigate and excel in the vicissitudes of a rapidly evolving business landscape. Firms may also use SM and collaborative networks as catalysts for innovation by drawing attention to new markets and proffering novel avenues for creativity and collaborative pursuits (Si et al., 2023; Teece, 2017).

DCs also play a key role in supporting service innovation, as they leverage the firm's potential to adapt quickly to change, facilitating their ability to innovate (Lütjen et al., 2019). Because DC theory is also linked to organizational resilience, resilience can be seen as an organizational dynamic capability to respond to and reinvent the organization in the face of sudden disruptions, enabling it to emerge even stronger than it was initially (Martín-Rojas et al., 2023). DC theory emphasizes the importance of organizational resilience and adaptability in an ever-changing environment, asserting that the ability to reconfigure resources and capabilities in response to environmental changes is critical to acquiring and sustaining competitive advantage.

Within the DC view, therefore, innovation and resilience are critical capabilities enabling firms to manage uncertain contexts and respond to environmental pressures (Do et al., 2022), especially service firms whose markets change and evolve relentlessly.

2.2. Service innovation, digital technologies, and collaboration networks

Innovation can be defined as a company's predisposition to enable creativity and experimentation and to introduce new products/services by seeking technological leadership in novel processes (Rauch et al., 2009). Service innovations focus on meeting customer needs, which can range from finding new customers for existing services to adding new services for current or new customers (Damanpour et al., 2009). Innovations may also include development of a new idea/practice that depends on collaboration among persons or units at any level of the organization (Do et al., 2022).

In recent studies that examine the main determinants or antecedents of service innovation in the digital age, two factors emerge as especially relevant to capturing valuable knowledge: collaboration in external networks and use of digital tools, such as SM (Muninger et al., 2022; So et al., 2023).

Service innovation is viewed as more complex and challenging than product innovation. It requires collaboration with customers and other network partners, resulting in more dynamic and less standardized processes (Lütjen et al., 2019). Firms' internal capabilities for service innovation may be insufficient in turbulent markets, making external collaboration and knowledge sharing with partners critical to new service development (Corral de Zubielqui et al., 2019). To enable collaboration and communication with customers and other external partners, firms are exploiting the interactive features of digital tools—especially SM platforms—to collaborate and communicate with customers and other external partners.

Table 1
Recent empirical studies examining innovation and resilience in a digital context.

Authors	Variables included	Research design	Data	Main findings
Blichfeldt and Faullant (2021)	Digital technology implementation, Product and service innovation, Competitive advantage (ROS).	Quantitative analysis (correlation).	Secondary data from 747 industrial firms.	Results indicate that firms with high levels of digital technologies can introduce more radical product and service innovations; corroborates key role of these technologies as catalysts for innovation.
Li et al. (2021)	Innovative practices to increase resilience (i.e., cooperation with third parties, customer service innovation).	Qualitative analysis (content analysis).	153 textual information sources from the restaurant industry.	Findings propose an innovative crisis management model and describe how specific innovative practices enhanced business resilience during the pandemics.
Do et al. (2022)	Innovation management initiatives (support), Organizational learning, Organizational resilience, Innovation.	Quantitative analysis (regression and path analysis).	Survey: 188 CEOs from SMEs (cross-industry sample).	The results confirm that innovation management initiatives positively influenced organizational resilience, which in turn enhanced innovation. Findings reveal the mediating role of organizational learning in these relationships.
Dovbischuk (2022)	Organizational learning, Innovation-oriented capabilities, Dynamic resilience, Logistics service quality, Firm performance.	Quantitative analysis (correlation).	Survey: 113 service firms.	Organizational learning and innovation-oriented capabilities were positively associated with higher levels of resilience during the pandemic. Resilience correlated with higher logistics service quality and better business performance.
Pratono (2022)	IT turbulence, Innovation (product development), Organizational resilience, Marketing communication, Competitive advantage (performance).	Quantitative analysis (SEM).	Survey: 582 managers.	Results show that organizational resilience exerted the most significant impact on firms' competitive advantage. Innovation also had a positive effect on firm performance.
Xie et al. (2022)	Business networks, Organizational resilience capacity, Ambidextrous learning, Digital technologies use.	Quantitative analysis (regression)	Survey: 409 firms	In the context of the pandemic, results demonstrate how business networks had a positive impact on organizational resilience. Findings also confirm the moderating role of digital technologies use in this relationship.
Forliano et al. (2023)	Technological orientation, Maturity of the digital strategy and Resilience to Covid-19.	Quantitative analysis (SEM).	Survey: 186 firms from different sectors.	Results confirm how the technological orientation of a firm positively affects the maturity of its digital strategy, leading to higher organizational resilience.
Junaid et al. (2023)	Supply chain dynamic capabilities, Supply chain integration, Resilience, Sustainable competitive advantage, Performance.	Quantitative analysis (SEM).	Survey: 325 professionals of the healthcare industry.	Findings illustrate how Supply chain dynamic capabilities improve Supply chain integration and resilience, driving competitive advantage and performance.
Santos et al. (2023)	Digital technologies, Entrepreneurial resilience, Firm performance.	Qualitative analysis (inductive qualitative approach).	42 interviews with successful entrepreneurs.	Digital platforms and infrastructures emerged as key enablers of resilience during the pandemic. Business resilience through digitalization led to better financial performance.
Yuan et al. (2022)	Organizational resilience, Absorptive capacity	Qualitative analysis (case study)	Single case study with information from a platform-based sharing company.	Considering resilience as an adaptive process, results confirm the crucial role of absorptive capacity as the main facilitator of organizational resilience.

Table 2
Mixed-methods research design.

Phase	Procedure	Outcome
Quantitative data collection	<ul style="list-style-type: none"> - Extensive literature review. - Proposal of the research model. - Pre-test of the questionnaire. - Web-based survey. - Data collection: sample of 343 service firms in Spain. 	<ul style="list-style-type: none"> - Numeric data. - Participant demographics.
Quantitative data analysis	<ul style="list-style-type: none"> - Software used: SPSS and LISREL. - Quantitative analysis conducted: <ul style="list-style-type: none"> • Non-response bias and common method bias • Exploratory factor analysis • Confirmatory factor analysis • SEM analysis. 	<ul style="list-style-type: none"> - Measurement model quality measures. - Structural model overall fit measures. - Research hypothesis testing.
Qualitative data collection	<ul style="list-style-type: none"> - Interview protocol development - Data collection: 12 semi-structured interviews with managers from service firms. 	<ul style="list-style-type: none"> - Transcribed interviews and notes.
Qualitative data analysis	<ul style="list-style-type: none"> - Software used: NVIVO. - Qualitative analysis conducted: <ul style="list-style-type: none"> • Coding and thematic analysis. 	<ul style="list-style-type: none"> - Codes and themes. - Conceptual model of emergent themes.
Integration of quantitative and qualitative findings	<ul style="list-style-type: none"> - Integration, explanation and discussion of quantitative and qualitative findings. 	<ul style="list-style-type: none"> - Development of meta-inferences: <ul style="list-style-type: none"> • Corroboration/confirmation of hypotheses. • Complementary findings

Source: Own elaboration based on Henderson and Green (2014)

Use of SM tools (platforms such as Facebook, Instagram, LinkedIn, Twitter, YouTube) and other digital technologies has exploded in recent years (Dwivedi et al., 2021a). Defined as “a group of Internet-based applications that build on the foundations of Web 2.0 ... [to] allow the creation and exchange of user generated content” (Kaplan & Haenlin, 2010, p. 61), SM technologies have become strategic tools transforming organizational processes and routines (Martín-Rojas et al., 2020). They enable open communication, helping firms to detect and adapt to customers’ needs proactively through new product/service creation (Parveen et al., 2016). Use of SM tools has transformed innovation processes, opening new opportunities for interaction and collaboration with customers in developing new ideas. Companies face challenges, however, in using these tools to foster innovation and collaboration. More research is needed to explore their use (Dwivedi et al., 2021a).

2.3. Organizational resilience

Organizational resilience is critical for business success in unstable contexts. The term derives from the Latin *resilire*, which means to bounce back or recover from a sudden disturbance (Nielsen et al., 2023). Organizational resilience has been defined as the firm’s ability to “anticipate potential threats, to cope effectively with adverse events, and to adapt to changing conditions” (Duchek et al., 2020, p. 220). It

reflects the organization’s ability to cope with and recover from sudden disruptions by adjusting and preserving (or improving) the firm’s functions (Su & Junge, 2023). Resilient firms possess not only the short-term coping capacity to recover from disturbances but also the long-term adaptative abilities to generate profound changes in their business models after the crisis (Li et al., 2021).

Resilience is conceptualized as a dynamic process by which organizations act to face unexpected events and leverage resources to maintain business functioning in response to adversity (Nielsen et al., 2023). Organizational resilience has in fact been examined extensively with DC theory as the main theoretical framework (Forliano et al., 2023; Junaid et al., 2023; Pratono, 2022; Yuan et al., 2022). DC theory argues that firms must build dynamic capabilities (processes and routines) to adapt to changing market conditions and avoid negative consequences (Su & Junge, 2023). Organizational resilience thus comprises a set of DCs that enable firms not only to absorb the impact of external disruptive events but to recover and improve, gaining competitive advantage (Dovbischuk, 2022).

Research on organizational resilience has grown exponentially in the past decade (Su & Junge, 2023). Some recent studies have examined the main drivers or facilitators of organizational resilience empirically, highlighting the following factors: appropriate leadership, strong culture and values, human capital and development, external knowledge base (social capital and networks), and digital resources (Hollands et al.,

Table 3
Mixed-methods approach and criteria.

Quality aspects	Quality criteria	Explanation on how this study followed guidelines of Venkatesh et al. (2013)
Purpose of mixed-methods approach	Corroboration/confirmation; Complementarity.	The study is divided into two phases: 1) quantitative survey-based study to verify proposed research model and test hypotheses proposed, and 2) qualitative study involving interviews with managers to validate and enrich quantitative results and obtain a richer understanding of the phenomenon.
	Sequential dominant quantitative investigation followed by a less-dominant qualitative analysis.	The objectives and scope of the qualitative investigation drawing on a set of interviews with service firms' managers are limited. This analysis was primarily used to confirm and support the results obtained in the quantitative study.
Design quality	Design appropriateness.	The study used a large quantitative survey-based study followed by a qualitative study to address the research questions. This strategy of designing a sequential study to validate and complement findings and ach richness to the overall study was relevant to the phenomenon of interest.
	Design adequacy.	<u>Quantitative:</u> 1) Sampling: the sample of respondent firms was randomly selected in Spain. 2) Measures: to ensure content validity, all measures were derived from prior empirical studies. Additionally, validity, reliability and dimensionality of the scales were statically confirmed. 3) Data collection procedure: An online survey was designed and implemented to collect the data.
	Analytical adequacy.	<u>Qualitative:</u> 1) Selecting suitable interviewees: The interviewees were all managers of services firms from different subsectors in Spain. 2) Understanding the field with credibility: The authors of the study had enough knowledge about the strategic variables under study and reviewed related literature to design an adequate interview protocol. 3) Conduct of the interviews: The were developed following the designed protocol, but being sensitive to the principles of flexibility, non-direction, specificity and range.
Explanation quality	Quantitative inference.	<u>Quantitative:</u> 1) Justification of choice of analysis technique (SEM analysis). 2) Sample size of 343 firms to ensure reasonable power. 3) Analysis of common method bias was conducted.
	Qualitative inference	<u>Qualitative:</u> 1) A complete transcription of the interviews was stored. 2) The interviews were analysed iteratively for the three authors, with the support of the NVivo software. 3) The process of identifying and assigning codes was iterative and resembled a constant comparative analysis. 4) Triangulation of data from 12 interviews. 5) Quotes given by interviewees were used to illustrate or evidence key concepts/relationships, which enhanced plausibility.
	Integrative inference	1) Internal validity: The research model was developed by building on dynamic capabilities' theory and related literature. We used validated measurement scales, carefully collected data, and conducted appropriated empirical tests. 2) Statistical conclusion validity: proven by ensuring construct validity and appropriate significance level for hypotheses, and testing for common method bias. 3) External validity: the analysis was conducting on a sample of Spanish service firms, but results will likely be similar if studied in other sectors or countries. However, context must be taken in consideration in each study. All constructs and relationships obtained through the qualitative study were plausible, and were considered relevant in recent literature. A research model was developed building on relevant literature, and was statistically tested drawing on a quantitative sample of 343 service firms in Spain. Subsequently, we performance a qualitative study, based on the 12 semi-structured interviews, which enabled us to corroborate and enrich the results previously obtained. The synergy between quantitative and qualitative results indicates a satisfactory level of integrative efficacy.

Source: Own elaboration adapted from Venkatesh et al. (2013)

2023; Isensee et al., 2023; Nielsen et al., 2023). Other studies have stressed the interlinkage and complementarity between innovation and organizational resilience (Do et al., 2022). The outcomes of prior literature on resilience have confirmed its impact on various performance outcomes, such as survival, organizational effectiveness, profitability indicators, and sales growth (Su & Junge, 2023).

Despite significant advances in this research field, substantial gaps remain. First, due to the complex and dynamic nature of resilience, a comprehensive understanding of its antecedents and outcomes, based on a solid theoretical framework is lacking (Do et al., 2022). Further, most empirical studies on the topic are based on cross-sectional data, which have limited capacity to examine temporal dynamics or establish

cause-effect relationships. Therefore, studies that analyze organizational resilience using a multi-method approach are needed to provide a more detailed understanding of the phenomenon (Hollands et al., 2023).

To provide deeper insight into the key themes emerging in the study of innovation and resilience in the digital context, Table 1 summarizes recent empirical research on the topic.

As Table 1 shows, research indicates that both innovation and resilience are important drivers of business performance. These effects have been examined in isolation, however, and no studies to date have analyzed the interrelations between the two variables, their joint effect on performance, or their main antecedents. Most prior studies have been quantitative and cross-sectional in nature, and the literature lacks more

comprehensive studies that combine quantitative and qualitative insights. Given these gaps, a mixed-methods approach is essential to investigating the linkages among SM, innovation, resilience, and firm performance in the digital context.

3. Research design

To obtain robust findings and achieve scientific rigor, a mixed methods approach integrating quantitative and qualitative analysis was used. This approach is especially beneficial in information systems, as it provides richer understanding of the study phenomenon and enables data triangulation (Venkatesh et al., 2013). Mixed-methods designs offer several advantages: they can “address confirmatory and explanatory research questions,” provide “stronger inferences than a single method,” and produce “a greater assortment of divergent and/or complementary views” (Venkatesh et al., 2016, p. 437). Mixed-methods design is also especially suited to overcoming the limitations of cross-sectional data (Maier et al., 2023). By integrating the findings of quantitative and qualitative studies, researchers can develop meta-inferences, the critical assets of mixed-methods analysis, to obtain a complete view (Reis et al., 2022; Venkatesh et al., 2013).

Our study used mixed-methods research for corroboration/confirmation and complementarity in order to gain complementary views of the phenomena (Venkatesh et al., 2016). A sequential mixed-methods design was followed, first conducting a quantitative survey-based study (Study 1) to evaluate the proposed research model and test the hypotheses, and then extending the quantitative findings through a qualitative study (Study 2). Table 2 presents the different phases and flow of the research design.

Epistemologically, our approach was positivist in the quantitative phase and interpretive in the qualitative analysis. Our study follows a “dominant/less dominant design,” in which one paradigm may be considered dominant (in our case, the quantitative) but another (in our case, qualitative data) is added subsequently to enrich and complement the analysis (Venkatesh et al., 2016). A sequential sampling strategy was used and data were analyzed sequentially to achieve the research objectives. Table 3 outlines our adherence to established criteria to ensure the validity of our mixed-methods research.

4. Study 1: quantitative study

4.1. Overview

To address the research questions, a research model was developed to explain how service innovation and resilience impact firm performance and the underlying relationships among the study variables. Next, the proposed model and research hypotheses are described. Phase 1 of the mixed-methods study involves empirical validation of the proposed research model. This model was empirically tested using structural equation modelling (SEM) methodology and data collected in a survey of 343 service firms in Spain.

4.2. Theoretical background and hypothesis development

Recent literature highlights the critical role of digital technologies, especially SM tools, in promoting innovation activities in changing environments (Muninger et al., 2022). Various studies have drawn on DC theory to describe the crucial role of SM use in improving firms’ sensing and seizing capabilities. These platforms enable organizations to capture valuable knowledge, shape business opportunities, and develop new products from the “sensed” opportunities in response to market trends (Mention et al., 2019; Warner & Wager, 2019). SM enable firms to connect with their customers and receive valuable feedback to improve existing products and services, thereby enhancing innovation processes (Dwivedi et al., 2021a). SM use thus enables and drives service innovation by stimulating companies to scan the environment and gather

external information. SM also support collaboration and knowledge flows to help firms implement and benefit from their steps toward innovation (Bhimani et al., 2019).

Recent studies confirm empirically the relevant impact of SM technologies in fostering service innovation. Analyzing firms from different sectors, Borah et al. (2022) observed that SM use positively and significantly affected firm innovation capabilities. Latifah et al. (2022) confirmed that SM tools support knowledge sharing among young entrepreneurs, leading to better innovation performance. Rakshit et al. (2021) found SM networks to be a useful external knowledge source supporting new product development during the pandemic. Based on the foregoing, Hypothesis 1 is proposed:

H1. Social media use positively affects service innovation.

In today’s complex and uncertain environment, companies must participate in collaborative networks to work with partners and gain valuable resources (Xie et al., 2022). Collaborative innovation is especially important in the service industry, where intense competition makes collaboration with customers and suppliers a key relational asset for companies’ innovation (Wang et al., 2016). In fact, business networks contributed significantly to companies’ adaptation during the Covid-19 pandemic by providing access to external resources, including knowledge (Xie et al., 2022).

Digital technologies, and especially SM tools, facilitate continuous knowledge sharing through multiple connections across organizational boundaries, enabling networking and collaboration (Kwayu et al., 2021). SM platforms enrich interactions and promote information sharing in a collaborative participatory approach, giving firms up-to-date knowledge from key stakeholders such as customers, partners, and suppliers (Dwivedi et al., 2021a; Wu et al., 2022). Recent literature stresses SM technologies’ role in enabling network interactions and facilitating knowledge sharing among network members (Muninger et al., 2022). In this vein, Corral de Zubielqui et al. (2019) demonstrated empirically that companies’ SM use enabled multiple connections with market-based actors (suppliers, customers, consultants), providing firms with valuable external knowledge flows. Similarly, Cepeda-Carrion et al. (2023) analyzed a sample of service firms to show the value of SM tools as a means of communication linking firms to important stakeholders, facilitating rapid coordinated response to market changes by developing new services. Thus, Hypothesis 2 is proposed:

H2. Social media use positively affects collaboration networks.

Competing in dynamic environments requires constant adaptation to and generation of innovative ideas (Markovic et al., 2021). To this end, organizations have increased knowledge acquisition from external sources to accelerate innovation processes (Natalicchio et al., 2018). External collaboration provides additional expertise to complement firms’ internal base, encouraging development of innovations (Nieves & Diaz-Meneses, 2018). In fact, service innovations are more dependent than product innovation on external knowledge and collaboration, and require deeper involvement of firms’ customers and other service ecosystem partners (Lütjen et al., 2019).

By joining networks, firms can collaborate with a wide range of stakeholders and share important knowledge for effective innovation (Corral de Zubielqui et al., 2019). Customers are key external partners who can provide critical insights through participation in co-creation activities, helping companies develop services that meet changing market needs (Ozanne et al., 2022). Collaboration with suppliers can assist firms in innovation processes by building on their distinctive expertise and knowledge of materials and techniques (Corral de Zubielqui et al., 2019). Even competitors become critical innovation partners, as they can provide essential complementary resources and participate in joint projects (Markovic et al., 2021).

Exploitation of external knowledge sources across a firm’s borders to generate new ideas, products, or services may be a critical antecedent of the dynamic capability to innovate (Dovbischuk, 2022). In this vein,

Lütjen et al. (2019) demonstrated empirically that external relationships with different cooperation partners played an essential role in successful development of service innovations. Similarly, Natalicchio et al. (2018) confirmed that externally acquired knowledge positively impacted the firm's innovation outcomes. Therefore, it is suggested that:

H3. Collaboration networks positively affect service innovation.

Organizational resilience is a dynamic capability that helps firms respond to disruptions in time to recover cost-effectively and even improve over the organization's pre-disruption state (Dovbischuk, 2022). Such resilience enables organizations to adapt and persist in the face of disruptions. Resilient organizations are agile, robust, well-integrated, and coherent. Organizational resilience is thus a key capability when firms face growing uncertainty in their business environment (Xie et al., 2022).

Service innovation also involves novel market or company services, changes in or extensions of service or delivery processes, and repositioning of services (Avlonitis et al., 2001). The ability to innovate contributes to firms' identification and understanding of novel ideas to solve problems, helping firms to better address external disruptions. Firms with greater capacity to innovate will thus achieve a higher level of organizational resilience (Dovbischuk, 2022).

Examining a sample of service firms during the pandemic, Li et al. (2021) confirmed that service innovation is important to firms' survival and generation of resilience in the face of external disruptions. Dovbischuk (2022) confirmed empirically a positive association of innovation capabilities with a higher level of dynamic resilience among logistics service providers. Based on the above, it can be assumed that organizations that engage in more service innovation are more resistant to disruption and can adapt more quickly to their competitive context to overcome uncertainty. In so doing, they also become more resilient. The foregoing evidence suggests that:

H4. Service innovation positively affects organizational resilience.

Service innovation is critical to service organizations' success because the environment in which they function and compete is always evolving (Newey & Zahra, 2009). Service organizations have typically included service innovation among their strategic objectives (Li et al., 2021). Such innovation is essential to coping successfully with volatile environments because it enables organizations to maintain and improve performance in the face of disruptive events (Dovbischuk, 2022).

Extensive prior literature has confirmed that innovation-oriented service organizations perform and compete better (Bustinza et al., 2019; Li et al., 2021; So et al., 2023). Firms that adopt innovative approaches are more likely to find and exploit opportunities (new

products, services, processes), contribute to revolutionizing service industry structures and contingencies in business models, and generate organizational growth processes (Dwivedi et al., 2022; Niemimaa et al., 2019), thus stimulating organizational growth (Covin & Slevin, 1991; Martín-Rojas et al., 2017). Not encouraging innovative activities negatively impacts organizations' productivity and performance. These negative effects are especially harmful to service organizations, while more service innovation helps these firms increase customer satisfaction, advocacy, and desired loyalty behavior; and to find strategies that enhance brand image, reduce costs, and facilitate product and service delivery (Li et al., 2021; So et al., 2023).

Examining previous studies on the topic, So et al. (2023) concluded that organizational innovation efforts enhance financial and market performance both directly and indirectly in the context of service firms. This finding leads to the following hypothesis:

H5. Service innovation positively affects organizational performance.

Building on DC theory, our study considers organizational resilience as a DC that enables firms to adapt better to their environment and tackle challenges more successfully (Beuren et al., 2022). Organizational resilience improves performance and business success, enabling organizations to emerge strengthened from challenges and external disruptions (Hollands et al., 2023).

When resilient organizations face uncertainty and instability, they outperform competitors and adapt to exploit new opportunities and gain competitive advantages (Hillmann & Guenther, 2021). Resilient organizations achieve their goal better, adapting more quickly to changing environments because they can face the uncertain future with creativity and optimism (Ayala & Manzano, 2010; Do et al., 2022). Resilience capability thus reduces the effects of disruptions through proactive response strategies, reconfigured processes, and optimal responses to environmental changes (Beuren et al., 2022), enabling resilient firms to perform better in disruptive situations (Anwar et al., 2023).

Recent empirical research has confirmed this relationship. Dovbischuk (2022) observed that a higher level of dynamic resilience was positively associated with better firm performance. Similarly, Praton et al. (2022) confirmed empirically that organizational resilience exerted the strongest influence on competitive advantage, measured in terms of financial performance. It is therefore proposed that:

H6. Organizational resilience positively affects organizational performance.

Fig. 1 summarizes the research model developed from the study hypotheses.

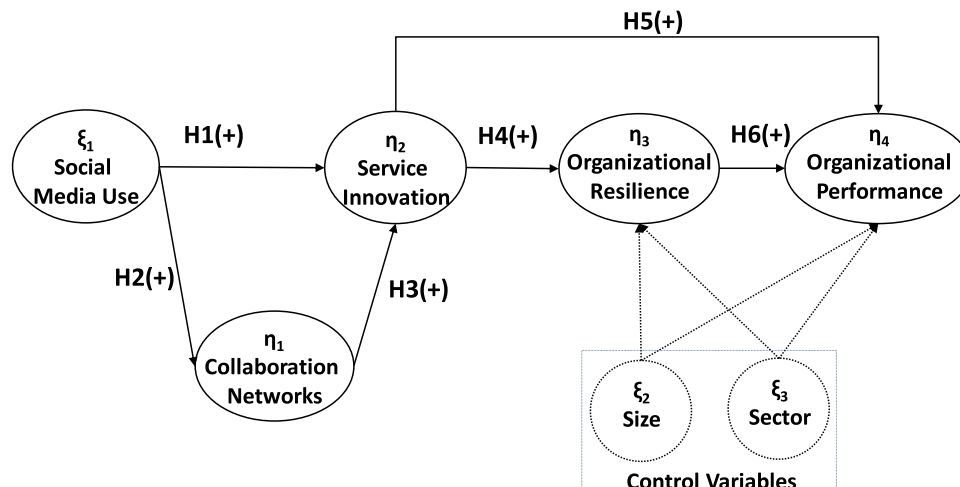


Fig. 1. Research model.

Table 4
Technical details of the quantitative research.

Variable	Data
Sector	Services sector
Geographic location	Spain
Methodology	Stratified random sampling
Universe of population	3210 firms
Sample size (% response)	950 (36.10%, 343) firms
Sampling error	5.0%
Data collection period	June to October 2022

4.3. Research methods

4.3.1. Data collection

The proposed research model was tested in a quantitative study with Spanish service companies. First, a preliminary structured questionnaire was developed based on existing literature. Several company directors, academics and consultants were then interviewed to check the comprehensibility of the items and to ensure appropriate content and wording. Based on suggestions from the experts consulted in the pretest, the questionnaire was revised to incorporate the recommended changes and obtain the final questionnaire, which examined how organizations handle these strategic issues.

General managers were selected as strategic informants because they lead departmental strategy design, and plan and direct the organization's future actions (Westphal & Fredickson, 2001). Drawing on information from the different departments, these CEOs steer strategic activity to enhance performance (Baer & Frese, 2002).

Using the Iberian Balance Sheet Analysis Systems (SABI) database and information from Spain's Ministry of Science and Research, the Andalusian regional government, and the Ministry of Economy, Innovation and Science, an accurate list of Spanish tourism firms was compiled to identify the study population. The SABI database has economic and financial information on more than 2.6 million companies (Spain and Portugal), including balance sheets and qualitative data. It is updated daily, and the information is obtained from various official sources.

Our study used stratified random sampling of 950 companies, establishing equal probability that any firm could be selected at any step during sampling. The companies were contacted by phone and e-mail to explain the study's purpose and offer them the opportunity to receive the results once the study was finished. Analyzing the results in aggregate and promising confidentiality of responses increased the response rate (36.10%, 343 valid responses (see Table 4)) and reduced the possibility of desirability bias.

A comparative analysis of two groups of respondents was performed, the companies that returned the completed survey within three weeks of receiving it and the companies that returned the survey only after follow-up reminders. This test assumes that late respondents are similar to non-respondents (Armstrong & Overton, 1977). Comparing the characteristics of the firms with late vs. early respondents (Table 5) indicated no significant differences between early and late respondents.

Table 5
Variables tested for non-response bias (early versus late respondents).

Characteristic	Early Respondents		Late Respondents		Statistics
	Mean	Standard Deviation	Mean	Standard Deviation	p Value
Size	1.18	0.466	1.15	0.432	0.590
Sector	1.86	0.910	1.91	0.935	0.668
Annual Turnover	1508.95	3693.255	1150.52	3654.94	0.368
Growth of Sales	4.85	1.70	4.94	1.66	0.647
Market share	4.71	1.63	4.87	1.54	0.348
ROI	4.29	1.69	4.31	1.68	0.922
ROA	4.21	1.65	4.26	1.63	0.754
ROS	4.36	1.60	4.49	1.61	0.457
ROE	4.89	1.49	4.96	1.48	0.635

4.3.2. Measures

All questionnaire items were derived from prior empirical research, and answers were recorded on seven-point Likert-type scales. As using constructs or scales derived from previous studies increases reliability and validity, our study drew on previously tested scales, adapting them to the purposes of this study (see Appendix 1).

Social Media Use (SM use). It was measured how often companies used SM platforms to engage key stakeholders, including Facebook (SM use1), Twitter (SM use2), YouTube (SM use3), and Instagram (SM use4) (1 very rarely - 7 very often), and following scales used in prior research (Choudhury & Harrigan, 2014; Garrido-Moreno et al., 2018). Our confirmatory factor analysis (CFA) ($\chi^2_2 = 25.60$; CFI=.95; GFI=.99; NNFI=.86; NFI=.95; see Appendix 2) validated this scale and confirmed validity, reliability ($\alpha = .758$), and one-dimensionality.

Collaboration Networks (CN). Building on existing research (e.g., Cepeda-Carrion et al., 2023; Oltra et al., 2018), a seven-item scale was developed to assess collaboration networks in the organization. Managers were asked about the collaborative network practices used in their companies over the past three years. CFA validated the scale ($\chi^2_{14} = 92.79$; CFI=.96; GFI=.98; NNFI=.94; NFI=.95), and the results confirmed the scale's one-dimensionality with high reliability ($\alpha = .864$) and validity.

Service Innovation (SI). Drawing on scales by Palacios-Marqués et al. (2015), Fraj et al. (2015), and Calantone et al. (2002), a six-item scale to measure service innovation was created and validated with CFA ($\chi^2_6 = 30.22$; CFI=.99; GFI=.99; NNFI=.99; NFI=.99). The results confirmed strong reliability ($\alpha = .930$) and one-dimensionality.

Organizational Resilience (OR). Building on the scales proposed by Connor and Davidson (2003) and Campbell-Sills and Stein (2007), a ten-item scale was developed by adapting the items of these scales to our study. The results of our CFA to validate the scale ($\chi^2_{35} = 140.28$; CFI=.99; GFI=.99; NNFI=.98; NFI=.98) confirmed the items' one-dimensionality, and good validity and reliability ($\alpha = .926$).

Organizational Performance (OP). Drawing on scales from prior studies (Martín-Rojas et al., 2020; Melian-Alzola et al., 2020) a seven-point scale with multiple indicators has been developed. This reflects the multidimensional nature of performance as a construct (Venkatraman & Ramanujam, 1986). The measures were also contextualized by comparing these indicators to those of their main competitor companies (common practice in recent studies) (Martín-Rojas et al., 2021). Whereas previous studies have relied on managers' perceptions to measure company performance, ours included questions on subjective and objective ratings. Where possible, correlations among the data were examined, and these were high and significant. A seven-point Likert-type scale compared organizational performance of direct competitors (1 much worse - 7 much better). The scale was validated using CFA ($\chi^2_9 = 61.14$; CFI=.99; GFI=.99; NNFI=.99; NFI=.99), which confirmed validity and the scale's one-dimensionality and reliability ($\alpha = .951$).

Control Variables: The control variables were firm sector (services subsector of activity) and size. Size was defined as large (250 + employees), medium (50–249), or small (fewer than 50) (García-Morales et al., 2006).

Table 6
Rotated component matrix for strategic measures.

Items	Component				
	1 Social Media Use	2 Collaboration Networks	3 Service Innovation	4 Organizational Resilience	5 Organizational Performance
SMU1					0.745
SMU2					0.726
SMU3					0.713
SMU4					0.723
CN1				0.605	
CN2				0.648	
CN3				0.705	
CN4				0.745	
CN5				0.810	
CN6				0.616	
CN7				0.788	
SI1			0.813		
SI2			0.784		
SI3			0.830		
SI4			0.798		
SI5			0.683		
SI6			0.821		
R1	0.747				
R2	0.791				
R3	0.703				
R4	0.642				
R5	0.673				
R6	0.609				
R7	0.770				
R8	0.683				
R9	0.827				
R10	0.794				
OP1		0.782			
OP2		0.780			
OP3		0.858			
OP4		0.858			
OP5		0.854			
OP6		0.789			

Extraction method: Principal Component Analysis. Rotation method: Varimax with Kaiser Normalization. A rotation converged in six iterations. Factor loadings less than 0.4 were eliminated.

Table 7
Means, standard deviations, correlations, and confidence intervals.

Variable	Mean	s.d.	1	2	3	4	5	6	7
1. Social Media Use	3.25	1.53	1.000	0.33-0.55	0.31-0.53	0.03-0.27	0.30-0.52	0.31-0.65	-0.23-0.03
2. Collaboration Networks	3.45	1.47	0.36***	1.000	0.40-0.60	0.17-0.38	0.31-0.53	0.15-0.50	-0.17-0.08
3. Service Innovation	5.04	1.43	0.34***	0.50***	1.000	0.47-0.65	0.31-0.51	-0.06-0.26	-0.16-0.08
4. Org. Resilience	5.56	1.16	0.13**	0.28***	0.46***	1.000	0.46-0.63	-0.03-0.31	-0.24-0.01
5. Org. Performance	4.59	1.45	0.32***	0.37***	0.41***	0.57***	1.000	0.18-0.50	-0.26(-0.04)
6. Size	1.16	0.44	0.30***	0.19***	0.07	0.10	0.20***	1.000	-0.41(-0.01)
7. Sector	1.89	0.92	-0.08	-0.02	-0.03	-0.12*	-0.12*	-0.11*	1.000

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; $n = 343$; Numbers above the diagonal: confidence interval between each pair of constructs (95%).

4.4. Results

Structural equation modeling (SEM) was employed to assess our research model using LISREL software. SEM was chosen because it offers the advantage of a multivariate statistical technique for testing models that propose causal relationships between their variables. SEM permits estimation of the effect and relationships among multiple variables; simultaneous analysis of the direct, indirect, and total relationships between variables; inclusion of such features as more than one dependent variable and their respective measurement errors; incorporation of mediating variables, model, and measurement errors; and comparison of models for different subsamples. The quality of the measurement model was analyzed and then the hypotheses were tested with the structural model (Anderson & Gerbing, 1988).

4.4.1. Measurement model

First, the psychometric properties of the measures were analyzed through factor analysis of each research item (Table 6). This analysis

indicated that the 33 items, clustered into five factors through varimax rotation method and principal component analysis, explained 66.71% of variance. The lowest item loading on any factor was 0.605. The five factors, in descending order, were organizational resilience (35.46% of variance), organizational performance (11.62%), service innovation (8.72%), collaboration networks (6.08%), and SM use (4.82%).

Next, the standard deviations, means and factor correlation matrix of the study variables were calculated (Table 7). The correlations were positive and significant.

All indicators fit the model well (Table 8), and composite reliabilities ranging from 0.84 to 0.95 (above the recommended minimums of 0.7) demonstrated satisfactory reliability. Average variance extracted (AVE) yielded similar results, ranging from 0.57 to 0.78 (AVE > 0.50; the variance a construct captures exceeds the measurement error). Cronbach's Alpha values of 0.75 and 0.95 were also above the recommended minimum of 0.707. It was detected a significant relationship between each load (λ) and its corresponding factor (t-values > 15.31), confirming the scales' internal consistency and reliability for Cronbach's Alphas,

Table 8
Results of the measurement model.

Variable	Items	λ^*	R ²	A.M.
Social Media Use	SMU1	0.80*** (22.22)	0.64	$\alpha = 0.758$; C.R.= 0.845 AVE= 0.578
	SMU2	0.71*** (15.31)	0.50	
	SMU3	0.77*** (20.47)	0.59	
	SMU4	0.76*** (20.96)	0.57	
Collaboration Networks	CN1	0.71*** (21.51)	0.50	$\alpha = 0.864$; C.R.= 0.905 AVE= 0.579
	CN2	0.72***(22.32)	0.51	
	CN3	0.71***(21.82)	0.50	
	CN4	0.73***(22.05)	0.53	
	CN5	0.88***(37.17)	0.77	
	CN6	0.72***(21.01)	0.51	
	CN7	0.84*** (30.48)	0.70	
Service Innovation	SI1	0.89***(56.07)	0.79	$\alpha = 0.930$; C.R.= 0.947 AVE= 0.750
	SI2	0.85***(34.04)	0.72	
	SI3	0.91***(62.53)	0.82	
	SI4	0.88***(42.79)	0.77	
	SI5	0.76***(26.18)	0.57	
	SI6	0.90***(47.25)	0.81	
Organizational Resilience	R1	0.83*** (32.89)	0.68	$\alpha = 0.926$; C.R.= 0.950 AVE= 0.658
	R2	0.88***(42.73)	0.77	
	R3	0.77***(25.73)	0.59	
	R4	0.71***(19.69)	0.50	
	R5	0.78***(26.67)	0.60	
	R6	0.71***(21.17)	0.50	
	R7	0.88*** (24.37)	0.77	
	R8	0.78***(18.79)	0.60	
	R9	0.89***(40.67)	0.79	
	R10	0.86***(28.95)	0.73	
Organizational Performance	OP1	0.77*** (23.70)	0.59	$\alpha = 0.951$; C.R.= 0.956 AVE= 0.785
	OP2	0.80*** (30.95)	0.64	
	OP3	0.97***(61.94)	0.94	
	OP4	0.97***(101.40)	0.94	
	OP5	0.97***(89.80)	0.94	
	OP6	0.81*** (23.71)	0.65	
Goodness of Fit Statistics	$\chi^2_{513} = 1533.42$ ($P > 0.01$) NFI= 0.95 NNFI= 0.96 GFI= 0.65 CFI= 0.97 IFI= 0.97 NCP= 992.42 RFI= 0.95 RMSEA= 0.07 ECVI= 5.00 AIC= 1711.42 CAIC= 2141.98			

AVE, and composite reliability (Fornell & Larcker, 1981) and supporting convergent validity for all multi-item scales.

Discriminant validity was assessed (Anderson & Gerbing, 1988; Fornell & Larcker, 1981) using various chi-squared tests to determine the difference between an unrestricted and a restricted model, limiting the estimated correlation parameter between each pair of latent constructs to 1.0. No confidence intervals for the estimated correlations between factor pairs included the value 1, establishing discriminant validity (Table 7).

These statistics demonstrate good measurement model fit ($\chi^2_{513} = 1533.42$ ($p > 0.01$); CFI= 0.97; NFI= 0.95; GFI= 0.65; IFI= 0.97; NNFI= 0.96; NCP= 992.42; ECVI= 5.00; RMSEA= 0.07; AIC= 1711.42; RFI= 0.95; CAIC= 2141.98; see Appendix 1). As the main variables had small beta pathway modification indices, additional paths would not significantly improve fit.

To reduce common method bias, the surveys were conducted anonymously. The defined objectives were clearly communicated to the respondents, previously validated scales were used and the items were presented in random order (Podsakoff et al., 2003; Podsakoff & Organ, 1986). No single component explained most of the variance, several components' eigenvalues were above one (Harman's factor test), and fit worsened in the one-dimensional (one-factor model) model. The data also showed differences of less than 0.200 between indicators of the common latent (first-order) factor and the theoretical research model with all measures as indicators. All tests thus discount common method bias as a problem affecting our data (Bou-Llusar et al., 2009).

4.4.2. Structural model

The proposed hypotheses were tested with a recursive non-saturated model, taking sector and size as control variables (exogenous latent variable SM (ξ_1); endogenous latent first-degree [CN (η_1)] and second-degree [SI (η_2); OR (η_3), Perf (η_4)] variables, and covariance and

asymptotic covariance matrix to estimate total, direct, and indirect effects (Table 9). Evidence from the structural model's standardized path coefficients supports the hypothesized relationship (Fig. 2) and indicates good overall structural model fit ($\chi^2_{549} = 1580.44$ ($p > 0.01$); CFI= 0.97; RMSEA= 0.07; NFI= 0.95; IFI= 0.97; NNFI= 0.96; PGFI= 0.56; NCP= 1031.44; RFI= 0.94).

The overall fit of the structural model was good and significant relationships were obtained between all constructs. The standardized parameters showed a strong influence of SM use on service innovation ($\gamma_{21} = .22$, $p < .001$) and collaboration networks ($\gamma_{21} = .46$, $p < .001$), supporting H1 and H2, respectively. Collaboration networks significantly influenced service innovation ($\beta_{21} = .40$, $p < .001$), supporting H3. SM use also indirectly affected (.18, $p < .001$) service innovation through collaboration networks (.46x.40; see calculation rules in Bollen, 1989)]. Further, SM use as a whole impacted service innovation at .40 ($p < .001$); service innovation had a significant effect on organizational resilience ($\beta_{32} = .54$, $p < .001$) and organizational performance ($\beta_{42} = .16$, $p < .01$), supporting H4 and H5, respectively; and organizational resilience was influenced by SM use (.22, $p < .001$) through service innovation (.22x.54) and collaboration network-service innovation (.46x.40x.54) and by collaboration network (.22, $p < .001$) through service innovation (.40x.54). Comparing the effect sizes shows that service innovation had a greater impact on organizational resilience than did SM use or network collaboration. Finally, organizational resilience influenced organizational performance ($\beta_{43} = .41$, $p < .001$), supporting H6. Organizational performance is thus indirectly influenced by SM use (.15, $p < .001$) through service innovation-organizational resilience (.22x.54x.41), service innovation (.22x.16), collaboration network-service innovation-organizational resilience (.46x.40x.54x.41), and collaboration network-service innovation (.46x.40x.16); and by collaboration networks (.15, $p < .001$), through service innovation (.40x.16) and service innovation-organizational resilience

Table 9
Proposed structural model results (direct, indirect, and total effects).

Effect from	To	Direct Effects	t	Indirect Effects	t	Total Effects	t	Confidence Interval
Social Media Use	→ Service Innovation	0.22***	3.30	0.18***	4.89	0.40***	6.60	0.05-0.21 (H1)
Social Media Use	→ Collaboration Networks	0.46***	6.60			0.46***	6.90	0.24-0.44 (H2)
Social Media Use	→ Org. Resilience			0.22***	5.78	0.22***	5.78	
Social Media Use	→ Org. Performance			0.15***	4.41	0.15***	4.41	
Collaboration Networks	→ Service Innovation	0.40***	6.59			0.40***	6.59	0.21-0.40 (H3)
Collaboration Networks	→ Org. Resilience			0.22***	5.56	0.22***	5.56	
Collaboration Networks	→ Org. Performance			0.15***	4.38	0.15***	4.38	
Service Innovation	→ Org. Resilience	0.54***	10.19			0.54***	10.19	0.36-0.53 (H4)
Service Innovation	→ Org. Performance	0.16**	2.36	0.22***	5.13	0.38***	6.16	0.03-0.32 (H5)
Org. Resilience	→ Org. Performance	0.41***	6.14			0.41***	6.14	0.40-0.77 (H6)
Size	→ Org. Resilience	0.06	0.78			0.06	0.78	
Size	→ Org. Performance	0.26***	3.56	0.02	0.81	0.28***	3.66	
Sector	→ Org. Resilience	-0.09	-1.58			-0.09	-1.58	
Sector	→ Org. Performance	-0.04	-0.68	-0.04	-1.49	-0.08	-1.27	
Goodness of fit statistics		$\chi^2_{549} = 1580.44$ ($P > 0.01$) GFI= 0.64 AGFI= 0.59 ECVI= 5.09 AIC= 1742.44 CAIC= 2134.29 NFI= 0.95 NNFI= 0.96 IFI= 0.97 PGFI= 0.56 PNFI= 0.88 NCP= 1031.44 RFI= 0.94 CFI= 0.97 RMSEA= 0.07						

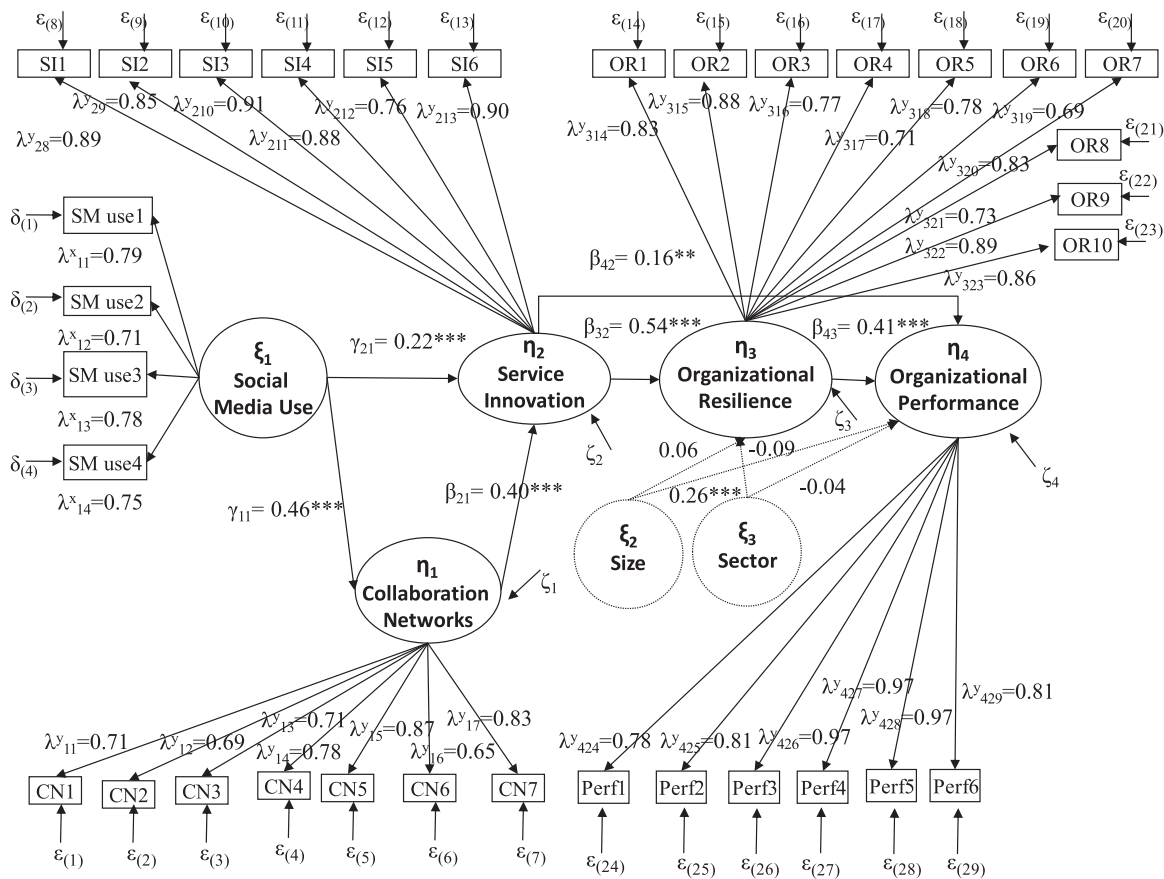


Fig. 2. Structural results of proposed model.

(.40x.54x.41). The total effect of organizational resilience on organizational performance was larger than that of SM use, collaboration networks, and service innovation.

Finally, the control variables showed a significant the relationship between size and organizational performance (0.28, $p > 0.05$). Overall, the results confirm that the model explains collaboration networks ($R^2 = 0.21$), service innovation ($R^2 = 0.29$), organizational resilience ($R^2 = 0.33$), and organizational performance ($R^2 = 0.40$) well. The resulting 95% confidence intervals and sampling error of 0.05 for the hypotheses (see Table 6) confirmed the significant and positive relationship among the variables analyzed in the hypotheses (intervals did not include zero).

Finally, comparison of different models confirmed that our proposed model provides the best representation of the data (Hair et al., 2016). Comparing this structural model (Model 1) to another models shows Model 1 to be the most acceptable, preferable, and parsimonious, as it best supports relationships among the study constructs (Table 10). Model 3, for example, showed worse AIC ($\Delta = 76.21$), NCP ($\Delta = 77.21$), RMSEA ($\Delta = 0.03$), and ECVI ($\Delta = 0.23$). The results thus confirm preference for our Model 1 over Model 3 ($\Delta\chi^2 = 78.21$) and the additional models.

Table 10
Proposed structural model against alternative statistical models.

Model Description	χ^2	$\Delta \chi^2$	RMSEA	ECVI	AIC	NCP
1. Proposed structural model	1580.44		0.074	5.09	1742.44	1031.44
2. W.R. Social media use to service innovation	1589.47	9.03	0.074	5.12	1749.47	1039.47
3. W.R. Service innovation to org. resilience	1658.65	78.21	0.077	5.32	1818.65	1108.65
4. W.R. Org. resilience to org. performance	1595.17	16.73	0.075	5.13	1755.17	1045.17

Notes: W.R. = Without relationship

5. Study 2: qualitative study

5.1. Overview

The results of Study 1 yielded interesting findings and quantitatively validated the research model and proposed hypotheses. To further corroborate the findings, enrich our understanding of the phenomenon and gain additional insights, 12 semi-structured interviews were conducted with managers of service companies. The rest of this section describes the qualitative research methodology and main findings.

5.2. Research method

5.2.1. Selection of the population

After analyzing the quantitative data, semi-structured in-depth interviews were conducted with managers in senior positions in service companies in Spain. The qualitative study helps us better to understand the empirical results, supports the reliability and validity of our findings (Flyvbjerg, 2001), and complements our understanding of the phenomenon.

After selecting a preliminary sample of 15 companies in the service sector, a purposive sampling strategy was used to identify participants. Resilient and innovative companies were selected based on their ability to provide information and deepen understanding of the strategic variables analyzed. Twelve companies consented to participate (80%), and managers were interviewed. Researchers held an individual meeting with each participant to conduct the interview. Table 11 presents the demographic information of the cases studied, based on the characteristics of the directors and companies. To protect confidentiality, the companies' names were anonymized and codes were used to reference them.

5.2.2. Data collection

The interview guidelines were designed to explore the antecedents of innovation and resilience in depth, and to examine the influence of service innovation and resilience in business performance. Participants were informed that the data would be treated confidentially and in aggregate form to maintain anonymity of both company and interviewee.

The research protocol had four parts. Part A collected general

information on interviewee and company. Part B explored the role of strategic processes designed by management to foster service innovation, and improves company's performance. Part C focused on the managers' perceptions of organizational resilience, its determinants and its impact on business performance. Part D collected information on additional issues related to business performance.

The interviews were conducted between July and October 2023. Each interview lasted an average of 60 to 90 min and was recorded and transcribed. The transcripts were analyzed, triangulated, and documented. The interviewees were informed of the research goals, and the researchers clarified terms and answered questions about the constructs analyzed. The transcription was then sent to the interviewees to check its accuracy (interviewees were permitted to clarify and improve the transcriptions). A set of pre-defined questions was used to guide the discussion, but interviewees were free to develop and explain their thinking, allowing the researchers to capture interesting insights.

5.2.3. Data analysis

Transcript data were analyzed using NVIVO 12 software, which is recommended for qualitative data analysis (Welsh, 2002) and provides patterns for meaning analysis. Notes and nodes were used to generate codes and patterns, seeking to identify key themes to formulate conclusions. A coding structure was used to interpret and categorize the data obtained from the interviews, with an emergent, not a previously established, coding scheme. Such thematic analysis provides both flexibility and rigor in identifying patterns in the material obtained from the interviewees' perspectives (Braun & Clarke, 2006).

To reduce potential bias, interviews were individually summarized and interpreted before analysis. The researchers synthesized each interviewee's statements with key findings to facilitate interpretation of the qualitative data. Thematic analysis was based on inductive and deductive coding. Firstly, deductive coding was used to develop coding schemes to classify the interview data into the constructs of the conceptual model. Secondly, inductive codes were assigned to themes that emerged from the interview data.

As recommended by previous studies, six phases were adopted in the thematic analysis process (Braun & Clarke, 2006): 1) familiarization with the data through transcription of interviews, in-depth reading, and observation of initial ideas; 2) generation of initial codes by identifying the ideas that stood out initially and developing an initial coding scheme

Table 11
Respondents' profile.

Codes	Managers' Characteristics				Firms' Characteristics		
	Gender	Age	Position	Experience	Firm Age	Activity	N.º Employees
I#01	Female	57	Business Manager	29	21	Tourism	209
I#02	Male	40	General Manager	16	13	Tourism	150
I#03	Male	56	General Manager	23	50	Education	1015
I#04	Female	41	Human Resources Manager	15	53	Financial	873
I#05	Male	51	General Manager	27	19	Education	126
I#06	Female	59	General Manager	20	49	Education	924
I#07	Male	48	Human Resources Manager	19	23	Technology	122
I#08	Female	52	Business Manager	30	83	Education	132
I#09	Male	45	Operational Manager	24	66	Transport	610
I#10	Male	44	General Manager	12	46	Distribution	102
I#11	Male	41	General Manager	6	40	Health care	104
I#12	Male	52	General Manager	15	30	Health care	120

by comparing the data from the different interviews; 3) search for themes comparing the code scheme generated to the literature, reducing the number of initial codes by grouping them into broader areas; 4) examination of the data to determine whether they supported the emerging themes and how some themes differed from others; 5) definition and naming of themes by defining themes and subthemes and establishing their final form; and 6) analysis of results by formulating the evidence and writing up the study findings.

5.3. Results: meta-inferences

As a critical outcome of mixed-methods research, meta-inferences integrate results from quantitative and qualitative strands of research (Tashakkori & Teddlie, 2008). Two approaches can be used to develop meta-inferences: bridging and bracketing (Venkatesh et al., 2013). Bridging develops a consensus between quantitative and qualitative findings, and bracketing captures contradictions and oppositions, incorporating a diverse view of the phenomenon of interest. As in previous studies (Chandra et al., 2022; Zhu et al., 2023), we used both approaches to obtain meta-inferences.

5.3.1. Meta-inferences: corroboration and confirmation

Inferential validity measures the quality of an explanation, enabling others to corroborate or confirm the implications and findings of the research (Venkatesh et al., 2013). The bridging approach was adopted (Srivastava & Chandra, 2018) to establish synergy between qualitative and quantitative results and integrated both findings to develop meta-inferences. Based on DC theory and related literature, our study finds that the results of the qualitative analysis support all hypotheses analyzed and tested in the quantitative study (see Appendix 3). The quantitative and qualitative perspectives were integrated, thereby confirming the validity of the conclusions drawn in the first study. Although the quantitative and qualitative studies had different sets of participants and data, the similarities in their findings corroborate the key role of innovation and organizational resilience in business performance, supporting the proposed research model and hypotheses.

5.3.2. Meta-inferences: complementary insights

The interviews highlighted strategic factors that complement the results of the quantitative work. The results of the qualitative study allowed us to gain further detailed insights (Venkatesh et al., 2013). To obtain these findings, the bracketing approach was used (Srivastava & Chandra, 2018), identifying three complementary insights described as follows:

Insight #1: Antecedents or drivers of service innovation. The interviewees highlighted the importance of several strategic factors for service innovation: transformational leadership, technology and digitalization, and proactivity. Transformational leadership draws on intellectual capital, know-how, and innovation to face the situation in the

environment. It encourages dynamic collaboration among company members by promoting new ways of doing things, solving problems, and opening minds to new ideas (García-Morales et al., 2012). Technology and digitalization create opportunities for innovative strategies, enabling firms to identify spaces of opportunity, knowledge, and ideas, and helping them to exploit innovations. Firms benefit from internal and external technologies and digitalization of their processes and services when seeking competitive advantages. Firms with a high degree of proactivity recognize the need to innovate and aspire to modify their environment, not simply adapt to it (García-Morales et al., 2011). Their proactive attitude and flexibility enable them to respond quickly to changes generating innovations. They see innovation as an essential element of their strategy.

Insight #2: Antecedents or drivers of organizational resilience. The interviewees also highlighted the importance of several strategic factors to organizational resilience, stressing three main factors: technology and digitalization, flexibility, and organizational culture. Digitalization and technology are frequently studied factors that influence business strategies. Managers identify them as antecedents of resilience, and prior research has shown that resilience capabilities mediate in the relationship between technology and organizational performance (Bustinza et al., 2019). Many studies have also demonstrated. Our qualitative findings indicate a positive impact of flexibility on resilience (Huang & Farboudi Jahromi, 2021). The results also identified a significant relationship between organizational resilience and culture. It is important to understand the role of developing a culture of resilience, as this culture becomes the foundation for improvement, future success, and ultimately resilience (Suryaningtyas et al., 2019).

Insight #3: Relevance of digital tools and soft skills. The qualitative research showed the positive influence not only of innovation and resilience but also of other important factors on performance: AI or Big Data, soft skills, and digital skills. Managers specifically highlighted the importance of Big Data applications or AI as significant emerging digital tools. Big Data help with the application of business intelligence, and AI drives more efficient work processes, improving company performance (Caputo et al., 2019; Chen et al., 2012). The managers also highlighted the importance of intangibles, such as strategic elements, in improving organizational performance. Human resources are a key asset that play a strategic role in organizational performance. Firms should foster interpersonal skills (e.g., creativity, communication, teamwork, active listening, learning, thinking, decision making, flexibility, commitment, empathy) to improve results.

Appendix 4 presents the complementary insights obtained from the qualitative study, including some of the evidence and word clouds developed to illustrate them. As a result of the NVIVO analysis, a number of key themes emerged when examining the key drivers of service innovation and resilience, as shown in the word clouds (Fig. 3).

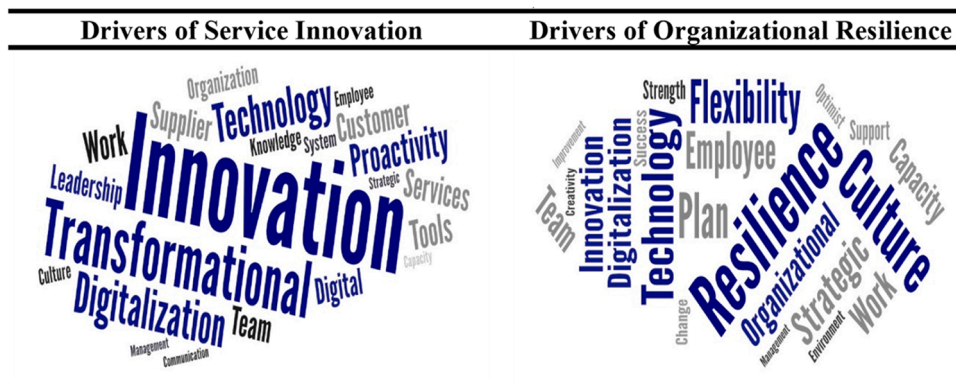


Fig. 3. Main drivers of service innovation and resilience (additional insights captured from interviews).

6. Discussion

In a context of instability, turbulence, and rapid technological change, companies must understand which strategic variables are key to remaining competitive. This study drew on dynamic capabilities theory to analyze the relevance of two strategic factors, service innovation and organizational resilience, by empirically examining their impact on business performance. To this end, a comprehensive research model was proposed, including the use of digital technology (SM) and collaboration networks as facilitators of service innovation. A sequential mixed-methods approach was followed. The research model was validated through quantitative analysis of a sample of 343 service firms. A qualitative analysis based on 12 interviews with service managers corroborated and extended the findings. The qualitative evidence supported previous findings, while providing a richer and more complete picture of the key drivers of service innovation and organizational resilience, highlighting other critical factors for business success. The following describes the most important results in further detail.

First, our findings confirm service innovation as an essential factor helping firms adapt quickly to market changes. More specifically, it was found that innovation had a positive and significant impact on organizational performance, confirming prior research (Li et al., 2021; So et al., 2023). The findings also showed that technological tools play a fundamental role in fostering innovation in a dynamic and changing landscape (Dwivedi et al., 2022), proving that SM tools enable collaboration and support development of new services (Bhimani et al., 2019). The results also highlight the strategic significance of external collaboration as a significant antecedent of service innovation (Dovbischuk, 2022; Lütjen et al., 2019).

Our meta-inferences provided a richer understanding of how to promote service innovation. The qualitative analysis highlighted the following drivers enhancing innovativeness in service firms: transformational leadership, leveraging of technology and digitalization, and promotion of proactivity. Transformational leadership appears to be essential for fostering employee creativity and empowering teams by providing support and inspiring vision (Chandran et al., 2023). Transformational leaders fostered an organizational culture that encourages collaboration and experimentation, enhancing service firms' innovation capabilities. The managers also stressed the strategic relevance of technology and digitalization. Digital transformation is reshaping business processes, producing infrastructural changes in the way firms operate and deliver value to customers (Kraus et al., 2022). As implementation of new digital technologies enables firms to capture valuable knowledge to guide innovation, it must be considered as a strategic investment. Further, findings suggest that proactivity promotes generation of new ideas and creative processes to anticipate market needs, increasing the firm's innovativeness (Martin-Rojas et al., 2020).

Second, our findings emphasize the importance of organizational resilience as a key variable for success in competitive environments. Our study conceptualizes resilience as a dynamic process involving firms' ability to respond and adapt quickly to sudden disruptions, transforming themselves to emerge even stronger (Forliano et al., 2023). Our results confirm that organizational resilience had the strongest impact on business performance, identifying it as the most important antecedent of firm success (Pratono et al., 2022). The study also demonstrated the complementary role of innovation and organizational resilience (Do et al., 2022), as the findings show that service innovation positively affects resilience in service firms.

Meta-inferences yielded additional insights into the key determinants of service firm resilience. The managers highlighted the specific importance of technology use and digitalization, flexibility, and organizational culture as strategic factors. Prior literature has shown the utility of digital technologies for building resilience, as they help the organization's members to leverage external knowledge and resources and adapt quickly to adversity (Nielsen et al., 2023). Our findings support this crucial and evolving role of digital resources in enabling

effective response to external disruptions. Flexibility was also highlighted as a relevant strategic factor and major building block of organizational resilience (Huang & Farboudi Jahromi, 2021). One manager (I#11) remarked: "Following Charles Darwin's idea, it is not the strongest company that survives, nor the most intelligent, but rather the one that is most flexible to better respond to change and become more resilient." Organizational culture was also identified as an important factor in building resilience (Su & Junge, 2023). A strong corporate culture, shared values, and embracing learning and change emerged as major facilitators of resilience.

Third, our analysis of how to improve organizational performance in a turbulent context identified additional important factors beyond innovation and resilience. Managers stressed the importance of using emerging technologies, such as AI or Big Data analysis. The IS literature has recently highlighted the special relevance of these tools (Kraus et al., 2022). Use of AI-enabled systems is expanding rapidly, becoming an integral part of many companies' business models and creating opportunities for continued innovation (Dwivedi et al., 2021b). By capturing and filtering data to produce actionable knowledge, Big Data analytics can help companies enhance their decision-making processes and define more efficient organizational processes (Caputo et al., 2019). However, human capital and staff skills play a key role in implementing and using these new tools properly. Good levels of soft skills are considered necessary in a changing and competitive environment (Dixon et al., 2010). Managers also mentioned the value of promoting digital and soft skills as strategic factors to improve business efficiency and obtain a competitive advantage (Trang et al., 2023).

To explain the findings in more detail, the discussion section is divided into three subsections: Theoretical contributions and implications, Implications for practice, and Limitations and future research lines.

6.1. Theoretical contributions and implications

Our research contributes to the literature on strategic management, innovation, and Information Systems (IS).

First, results extend DC theory (Teece et al., 1997) by demonstrating that service innovation and resilience are critical capabilities by which firms can manage uncertain contexts and respond to environmental pressures (Do et al., 2022). This finding is especially important for service firms, whose market is continuously changing and evolving. Both innovation and resilience enable firms to anticipate, seize opportunities, and adapt rapidly to the dynamic environment, exploiting both internal and external enterprise-specific competences (Do et al., 2022; Martin-Rojas et al., 2020). Our findings also reinforce the assumption that organizational resilience is a dynamic process rather than an outcome (Nielsen et al., 2023). Resilience thus emerges as an essential capability of the firm, promoting firm performance in changing landscapes (Anwar et al., 2023). In sum, our results complement the DC view, as the variables examined in the research model (SM use, collaboration networks, service innovation, organizational resilience) represent critical capabilities that enable firms to adapt and respond quickly to ensure competitiveness in an emerging digital economy (Warner & Wager, 2019).

Apart from the DC view, this study contributes to the literature on innovation by empirically confirming the importance of external collaboration to obtain valuable knowledge and foster innovation in today's volatile environment. By enhancing collaboration networks (Corral de Zubielqui et al., 2019), firms can gain valuable knowledge from external actors, taking advantage of SM potentialities to develop collaborative service ecosystems. In analyzing the case of service firms, our paper complements previous research on innovation as a way to strengthen firm-customer interaction by improving external collaboration; enhancing business intelligence, knowledge capture, and knowledge sharing; and involving internal and external stakeholders (Corral de Zubielqui & Jones, 2020; Secundo et al., 2021).

Our research also contributes to the IS literature. The results confirm empirically the importance of digital tools (especially SM platforms) in fostering service innovation (Muninger et al., 2022) and highlight the critical importance of other technologies, such as big Data and AI, as drivers of business performance in the digital age. Our results stress the importance of promoting digital and soft skills at organizational level to implement and use these technological tools properly.

6.2. Implications for practice

Our research findings have significant implications for managers. Firstly, the results identify SM technologies as key digital technologies for firms, which have become vital resources for firms in today's markets to enhance collaborative networking and information sourcing. According to this evidence, managers should increase their efforts to promote the use of SM tools because of its tremendous value as a source of new knowledge. Our digital era demands that companies embrace the new digital economy by proactively leveraging cutting-edge digital tools. Service firms should embrace digital transformation by incorporating these tools (e.g., SM, Big Data, AI), as findings have shown that such applications enable companies to transform their processes, respond quickly to changing market demands, and become more resilient. Using these technologies will help firms to leverage innovation and build resilience.

To leverage the full potential of digital tools to enhance innovation, companies should promote collaborations with external stakeholders to acquire valuable external knowledge. As service firms must cocreate innovative experiences with a range of interdependent stakeholders (suppliers, customers, partners), managers should encourage an innovative culture that promotes collaboration networks to improve information flows and co-creation processes. Companies must collaborate in networks to capture valuable knowledge to innovate, seize market opportunities, and differentiate their offerings from those of their competitors. On the basis of the results of the study, companies should prioritize service innovation as a key strategic initiative to adapt to today's turbulent environment. To foster an innovative culture, managers should encourage open collaboration and the use of digital technologies, as these tools have been shown to be critical antecedents of innovation. Top management should also encourage the creativity and proactivity of employees at the corporate level by providing appropriate incentives for them to exploit their full potential in developing improvements in the company's service offering. Results illustrate also the relevance of developing a transformational leadership, which can be crucial to enhancing an organization's ability to dominate their market segment, generate resilience, and speed up service innovation at enterprise-wide level.

Finally, the findings suggest that in the current turbulent landscape, managers need to focus on building organizational resilience to reduce firms' vulnerability to adversity and enhance their ability to recover more quickly from external disruptions. By fostering resilience, organizations cultivate a critical ability to transform themselves to adapt to changes in their external context. As the evidence confirms that this capability is a key driver of sustainable performance, managers should focus on developing strategies to build a resilient organization, promote flexibility and develop a strong organizational culture. The use of technology and digitalization has become a useful vehicle for capturing valuable market knowledge and adapting quickly to change. Managers should therefore encourage the use of digital tools as they are useful in building organizational resilience.

6.3. Limitations and future research lines

The study's limitations propose useful lines of future research. First, the empirical studies (quantitative and qualitative) were conducted in a single sector (service firms) in Spain. Future studies could confirm the

findings by replicating the study in different sectors or geographical contexts. Second, the data were obtained from key respondents, who may have interpreted the variables subjectively. Although anonymity was guaranteed to mitigate social desirability bias in these self-reports and additional analyses were conducted to detect bias, future studies should measure the dependent and independent variables with different data sources and include data from other key informants, such as employees or customers. Finally, the proposed research model includes the impact of two main variables, service innovation and organizational resilience, on business performance. Since additional factors emerged in the qualitative analysis, it would be valuable to explore the impact on performance of other significant variables. In this regard, it would be of great interest to study the direct impact of the use of key digital tools, such as big data or AI (Dwivedi et al., 2021b), on performance. Future studies should also examine the impact of intangible resources, such as soft or digital skills (Trang et al., 2023).

7. Conclusion

Firms find it challenging to remain competitive in uncertain and turbulent contexts, where change is the only constant. Our study built on DC theory to develop a research model that incorporates service innovation and organizational resilience as critical variables in fostering firm performance. A sequential mixed-methods approach is adopted, using a quantitative study to validate the proposed model and a qualitative analysis to provide complementary insights into the phenomenon under study. The results contribute to the literature by confirming the importance of innovation and resilience as key dynamic capabilities to address the changing business landscape and remain competitive. Our findings also highlight the specific relevance of SM tools and collaboration networks as direct drivers of service innovation and provide valuable guidance to help managers improve business performance by becoming more innovative and resilient in today's digital context.

CRediT authorship contribution statement

Víctor J. García-Morales: Writing – review & editing, Writing – original draft, Methodology, Investigation, Funding acquisition, Conceptualization. **Aurora Garrido-Moreno:** Writing – review & editing, Writing – original draft, Supervision, Methodology, Investigation, Funding acquisition, Conceptualization. **Rodrigo Martín-Rojas:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Funding acquisition, Conceptualization.

Declaration of Competing Interest

We wish to confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome.

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Appendix 1. Measurement items

Variable	Items	Description	Authors		
Social Media Use (SM)	SMU1	Facebook.	Choudhury and Harrigan (2014);Garrido-Moreno et al. (2018)		
	SMU2	Twitter.			
	SMU3	YouTube.			
	SMU4	Instagram.			
Collaboration Networks (CN)	CN1	Participation in activities aimed to get ideas from both real and potential customers.	Cepeda-Carrión et al. (2023);Oltra et al. (2018)		
	CN2	Participation in activities aimed to get ideas from both real and potential suppliers.			
	CN3	Participation in collaborative activities with the competition.			
	CN4	Sponsoring research by universities and research centers to develop research projects.			
	CN5	Research partnerships with other firms or R&D consortia.			
	CN6	Participation and collaboration with advisers and consultants.			
Service Innovation (SI)	CN7	Participation in innovation cluster or networks.	Calantone et al. (2002),Fraj et al. (2015); Palacios-Marques et al. (2015)		
	SI1	Our new innovative products and services offered to our clients/customers have increased over the last three years.			
	SI2	Our organization seeks out new ways to do things.			
	SI3	Our organization frequently tries out new ideas of products and services.			
	SI4	Our organization is creative in its methods of operation (processes).			
	SI5	Our organization is often the first to market with new products and services.			
	SI6	In recent years, we have developed changes and improvements in the products and services that we offer to our clients/customers.			
Organizational Resilience (R)	R1	Our organization has been able to adapt to changes because of Covid-19.	Campbell-Sills and Stein (2007),Connor and Davidson (2003)		
	R2	Our organization can deal with whatever comes as a consequence of the Covid-19.			
	R3	Our organization has taken the problems related to Covid-19 with a good predisposition and has seen its positive side.			
	R4	Dealing with the stress generated by Covid-19 has strengthened my organization.			
	R5	After suffering a serious hardship or illness, such as the global pandemic situation, my organization has been able to bounce back.			
	R6	The organization has been able to achieve its goals despite the obstacles of Covid-19.			
	R7	Our organization can stay focused under the pressure exerted because of Covid-19.			
	R8	Our organization has not discouraged by problems or failures.			
	R9	Our organization has been a strong organization in the face of difficulties related to Covid-19.			
	R10	Our organization has been able to correctly manage setbacks, unstable or unpleasant situations caused by the pandemic.			
	Organizational Performance (OP)	OP1		Sales growth.	Martín-Rojas et al. (2020);Melian-Alzola et al. (2020); Venkatraman and Ramanujam (1986)
		OP2		Market share growth.	
OP3		Return on investment (ROI).			
OP4		Return on assets (ROA).			
OP5		Return on sales (ROS).			
OP6		Return on equity (ROE).			
Size Sector	SIZE	Number of employees.	García-Morales et al. (2006) Martín-Rojas et al. (2021)		
	SECTOR	Service activity.			

Appendix 2. Goodness of Fit Statistics (SEM analysis)

Measures of absolute fit: Degree to which the structural and measurement model predicts the observed correlation or covariance matrix.

GFI (Goodness of Fit Index): Proportion of variance accounted for by the estimated population covariance.

NCP (Estimated Non-centrality Parameter): Alternative measure to χ^2 that is less affected by sample size.

ECVI (Expected Cross-validation Index): Approximation of the goodness of fit achieved by the estimated model in another sample of the same size.

Measures of incremental fit: Comparison of the proposed model with a reference model (null model: real model that the rest of the models are expected to outperform).

CFI (Comparative Fit Index): Compares the fit of a target model to the fit of null or independent model.

NFI (Normed Fit Index): Relative comparison of the proposed model to the null model.

NNFI (Non-Normed Fit Index): It combines a measure of parsimony into a comparative index between the null and proposed models (It is preferable for smaller samples).

IFI (Incremental Fit Index): Adjusts NFI for degrees of freedom and sample size.

RFI (Relative Fit Index): It compares the performance of the proposed model with the performance of a null model in which there was no correlation between observed variables.

RMSEA (Root Mean Square Error of Approximation): an absolute fit reflecting the fit between the variance-covariance matrix of observed variables and the model-implied variance.

Measures of parsimony fit: The parsimony of a model is the degree to which it achieves fit for each estimated

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coefficient or parameter. There is no associated statistical test for these indices, so their use is more appropriate when comparing alternative models.
 AIC (Akaike Information Criterion): Comparative measurement between models with different numbers of constructs.
 CAIC (Consistent Akaike Information Criterion): similar to AIC. However, the CAIC confers a penalty if the sample size is small.
 PGFI (Parsimony Goodness of Fit Index): A re-specification of the GFI with high values that reflect greater parsimony of the model.

Appendix 3. Meta-inferences: Corroboration and confirmation

Hypothesis#	Hypotheses	Representative Evidence
H1	Using SM positively affects service innovation	<p>“We plan and invest in digital platforms and social media that give us information about our target audience to create a personalized social experience according to needs and preferences. Likewise, we use vertical social media focused on maximizing the particularities existing in our sector as mechanisms to innovate and exponentially boost our results”. (I#07)</p> <p>“Social media is essential tools to innovate in business, and this innovation is a necessity in the current hostile and dynamic environment”. (I#04)</p> <p>“Social media have helped the internal organization by innovating to work more effectively, developing creative solutions to business problems and energizing relationships and collaboration between employees”. (I#01)</p>
H2	SM use positively affects collaboration networks	<p>“Social media has promoted the digitalization of relationships with clients and suppliers and the production of bilateral synergies”. (I#03)</p> <p>“We are at that moment where the general management of the company is working on a plan to use social media well and enhance the knowledge and skills for the use of these tools. The objective is to humanize these networks as a mechanism for internal knowledge management and learning from our stakeholders”. (I#12)</p> <p>“The firm is increasingly encouraging employees to use their social media to create collaboration networks that drive corporate branding, relevant communication across all social software channels, and engaging with customers, suppliers, and society in general”. (I#10)</p>
H3	Collaboration networks positively affect service innovation	<p>“The promotion of collaborative networks has had a strong impact on our service innovations. Continuous collaborations and the composition of our collaborative network positively (with suppliers, clients, and research organizations) influence innovation”. (I#07)</p> <p>“We have replaced the “it is not possible” with the “we do not know how to do it alone” and we need collaboration networks to learn, manage that knowledge and innovate”. (I#11)</p> <p>“There are collaboration networks where best practices and tacit and explicit knowledge is shared. As a result of this common learning, innovations are implemented”. (I#09)</p>
H4	Service innovation positively affects organizational resilience	<p>“Innovation is one of the strategic bases of resilience. Resilient companies have the capacity to learn and innovate in the face of changing environmental situations”. (I#02)</p> <p>“The expansion of innovations and new ways of doing things has helped to act proactively to this increasingly turbulent environment. These innovations have also helped boost personal attributes and promote resilience”. (I#06)</p> <p>“In the firm there is an organizational culture that favors the sharing of ideas, knowledge and innovations which boosts the resilience of employees individually and of the company as entity”. (I#03)</p>
H5	Service innovation positively affects organizational performance	<p>“Innovations take time to obtain results. We have to be patient. Innovation should be analyzed as a marathon and not as a sprint. Only by innovating do you improve performance”. (I#05)</p> <p>“We don’t want anyone to give us anything. We just want you to listen to us and open the door and we will innovate and then we will obtain results”. (I#04)</p> <p>“First, we have researched the needs, desires and preferences of our clients and have aligned ourselves with their vision. Second, we have creatively innovated following personalized customer recommendations in real time and during the provision of the service. Third, substantially improving our results”. (I#08)</p>
H6	Organizational resilience positively affects organizational performance	<p>“Resilience represents an important predictor of organizational performance. Greater resilience in the organization has generated greater satisfaction, participation and work commitment, which has allowed for improved results”. (I#03)</p> <p>“Being resilient has led us to seek competitiveness without undercutting the service. It is about making the customer feel that they are receiving what is fair for the amount of money they have paid. We have also increased the support and security offered in the service, problem solving and service provision according to the client’s needs. All of this has allowed us to be more resilient and improve our results”. (I#01)</p>

Appendix 4. Meta-inferences: Complementary insight

Meta-inference	Representative Evidence
Insight #1	<p>“When results are not achieved with innovation, it is due to the lack of an adequate leadership. The example of inspirational and transformational leaders is essential to creating an innovative culture. Leaders show how much they value innovative attitude. For example, if they recognize creative contributions from their collaborators, it will encourage them to continue contributing ideas and they will feel free to share their ideas and innovate”. (I#01)</p> <p>“Technology and digitalization are important for our firm and everyone, from employees to top managers, is involved in their management. In today’s digital, connected world with digital and technological systems, it is strategic to obtain knowledge and information through these systems. The high-value knowledge obtained through them allows us to be more innovative. Technology and digitalization are an investment for innovation and not an expense”. (I#07)</p> <p>“Proactivity allows us to anticipate problems and take innovative measures to solve them before they become an obstacle to business success. Proactivity implies the ability to take the initiative, seek opportunities and actively innovate”. (I#09)</p>

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Meta-inference	Representative Evidence
Insight #2	<p>“Adapting Charles Darwin’s idea, it is not the strongest firm that survives, nor the most intelligent, but rather the one that is most flexible to respond better to changes and becomes more resilient. Being flexible has to be within our organizational mindset to add value and that flexibility in the face of new things boosts our resilience, our ability to face adverse situations with a positive outlook”. (I#11)</p> <p>“Technology and digitalization have proven their importance in responding to crisis situations and being more resilient. A flexible ICTs plan was executed to advance resilient capacity and improve competitiveness. Resilience was promoted through employees improving their capabilities through technology”. (I#01)</p> <p>“The Covid-19 pandemic established the urgent need to redefine our organizational culture under innovative thinking and internal strengthening. This organizational culture of management of our competencies is closely linked to the existence of resilience”. (I#09)</p>
Insight #3	<p>“We are using artificial intelligence and big data to know where we are compared to the competition and how our services are doing in the market. These tools give us the ability to offer added and differentiating value that allows us not only to attract customers but also to retain them and improve our results”. (I#12)</p> <p>“Soft skills are skills that generate tangible results and have a strong impact on our bottom line, sales and income”. (I#08)</p> <p>“To improve performance in our firm we have to train different workers (reskilling), others must perfect their skills (upskilling), but everyone must develop digital skills even for services that we do not have implemented yet.” (I#07)</p>

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