


RESEARCH

Open Access



# Digital transformation influence on organisational resilience through organisational learning and innovation

Jeehan A. R. Awad<sup>1\*</sup>  and Rodrigo Martín-Rojas<sup>1</sup>

\*Correspondence:  
jeehan@correo.ugr.es

<sup>1</sup> Facultad de Ciencias  
Económicas y Empresariales,  
Universidad de Granada, P.º de  
Cartuja, 7, 18011 Granada, Spain

## Abstract

This study investigates the substantial influence of digital transformation (DT) on enhancing organisational resilience by examining the contributions of organisational learning and innovation—dimensions frequently overlooked in prior research. By addressing this gap, the study not only empirically validates these associations, but also conducts a rigorous examination using a sample of 376 small and medium-sized enterprises (SMEs) in the Andalusia region of Spain, selected through purposive sampling to include 259 respondents. The findings from regression analysis reveal how digital technologies facilitate organisational learning and innovation, thereby augmenting the resilience of SMEs. Empirical evidence indicates that these technologies enhance SMEs' learning capacity and stimulate innovation, ultimately improving their adaptability. This increased flexibility enables SMEs to respond adeptly to market fluctuations and capitalise on emerging opportunities.

**Keywords:** Digital transformation, Organisational learning, Innovation, Organisational resilience

## Introduction

In the current business environment, organisations face escalating challenges as they strive to ensure their viability and prosperity (van der Vegt et al., 2015). These challenges include heightened stakeholder expectations, rapid technological advancements, and shifts in consumer preferences and market dynamics, all impacting their operational strategies (Raj et al., 2022). Consequently, there is a growing recognition of the imperative for enterprises to enhance their organisational resilience (OR) and foster innovation (Liu & Yin, 2020). This imperative stems from the pivotal role played by resilience in enabling adaptive decision-making and the exploration of alternative courses of action amid turbulent circumstances (Kantur, 2015; Lengnick-Hall et al., 2011), thereby reinforcing the sustainability of business endeavours (Guilhermino Trindade et al., 2012). Incorporating technological technologies in different companies helps organisations to become resilient. This requires companies to be innovative (Bustinzá et al., 2016). This is because innovations (INN) are pivotal and entail modifying existing organisational efficiencies (Mezias & Glynn, 1993). In an increasingly competitive business milieu, innovation is

acknowledged as a fundamental driver for companies aiming to establish sustainable competitive advantages (Wang & Wang, 2012). Innovation can be delineated into two dimensions: enhancements and novel trajectories. Enhancements involve solutions tailored to better align with prevailing value propositions, address existing challenges, or chart new courses (Verganti & Shani, 2016).

Digital transformation (DT) represents an innovative approach to meeting customer demands while ensuring the sustainability and competitive edge of the company. This entails companies innovating to adapt to changes, retain customers, address their needs, and refine business portfolios, thereby coalescing around a long-term business strategy (Damanpour & Gopalakrishnan, 1998; Roberts & Amit, 2003). Consequently, digital transformation has been recognised as a strategy to enhance business performance and resilience (Schallmo et al., 2019). Moreover, it aids in maintaining a competitive advantage by reconfiguring the organisation to leverage existing core competencies or cultivate new ones (Liu et al., 2011).

Hence, digital transformation is inherently intertwined with strategic shifts in business models through the integration of digital technologies (Gregori and Holzmann, 2020). It is perceived as an avenue for fostering innovation (Hinings et al., 2018), as it stimulates the generation of fresh ideas and enhances communication and operational efficiencies (Bharadwaj et al., 2013; Díaz-Chao et al., 2015). Both innovation and digital transformation necessitate the acquisition and assimilation of new knowledge and ideas (Hurley & Hult, 1998), which enriches the organisational memory and knowledge repository (Salavou et al., 2004). Consequently, this aids companies in developing products, services, and business processes that confer competitive advantages (Cefis and Marsili, 2005), thereby enhancing organisational performance and capacity (Lipshitz et al., 1996). Moreover, innovation necessitates the dissemination of this knowledge within the organisation (Cohen & Levinthal, 1990).

Therefore, Organisational Learning (OL) plays a vital role in enhancing company understanding and development. Learning amplifies creativity and utilises knowledge to foster innovations, relying on organisational intelligence (García-Morales et al., 2007). Kuchinke (1995) characterises learning within organisations as the fundamental process through which they engage with their surroundings, absorb information, and adjust to evolving external and internal circumstances. This viewpoint emphasises the essential role of learning in enabling organisations to function as dynamic entities within their environments, continually evolving to meet new challenges and opportunities.

This is why, Bhatnagar, (2008) pointed out that innovation can be increased through learning (Kogut and Zander, 1992), and that technological development and digital technologies contribute to the development of ways to acquire this knowledge from a specific attributable to loneliness and transmission to another person (Dar et al., 1995).

Transformation is supported by providing necessary knowledge and backed by innovation to enable companies to maintain their performance and develop competitive advantages that will enable them to continue to exist in the volatile market in the future (Srikallmah et al., 2020; Argote and Miron Spector, 2011).

This study seeks to address a notable gap in the current literature by empirically examining the impact of digital transformation on organisational resilience, focusing particularly on the mediating roles played by innovation and organisational learning. While prior

research (Robertson et al., 2022; Matos, 2022; Sgobbi & Codara, 2022) has acknowledged the potential of digital transformation in enhancing organisational performance, its significance in bolstering corporate resilience is increasingly evident (Nielsen et al., 2023). However, empirical evidence regarding its precise influence on organisational resilience, particularly within the domain of small and medium-sized enterprises (SMEs), remains limited. Understanding how digital transformation drives innovation, both in products and services, as well as knowledge development, is crucial for elucidating how companies can enhance their adaptability and innovation capabilities (Xie et al., 2022) and achieve positive outcomes in uncertain environments (Do et al., 2022). Additionally, exploring how innovation and organisational learning, facilitated by digital transformation, contribute to the development of organisations' proactive, preventative, and developmental responses to general adversities, alongside identifying contextual factors influencing the role of critical organisational capabilities such as innovation, is imperative for enhancing organisational resilience (Melian-Al-Zola et al., 2020).

Moreover, while existing studies have underscored the positive association between digital transformation, innovation, and organisational resilience, there remains limited understanding of the mechanisms through which these constructs interact. Consequently, this study aims to address these gaps by investigating whether digital transformation enhances organisational resilience in SMEs through its impacts on innovation and organisational learning.

Specifically, this study will delve into the relationships among digital transformation, organisational agility, innovation, and organisational learning in SMEs, with a focus on comprehending the underlying mechanisms driving these relationships. Therefore, this study aims to answer the question "Does digital transformation enhance organisational resilience in small and medium enterprises through innovation and learning?" Employing a quantitative research design, surveys will be utilised to collect data from SMEs across various countries. Statistical techniques such as regression analysis and structural equation modelling (SEM) will be applied to analyse the data and assess the proposed hypotheses. Additionally, qualitative insights will be integrated through interviews or case studies to provide deeper insights into the processes at play. This hybrid approach will enable a comprehensive investigation into the intricate interplay among digital transformation, organisational agility, innovation, and organisational learning in SMEs, thereby contributing both theoretical insights and practical implications for managers and policymakers.

The article is organised as follows: the next section consists of a literature review that has been carried out to propose a research model and to describe the hypotheses of our research. Then we introduce the methodology, analyse the data, and discuss the results. Finally, we include concluding remarks, implications for scientists and managers, and limitations and lines for future research.

### **Theoretical framework and research hypotheses**

The purpose of the study is to examine the role of digital transformation in achieving organisational resilience through organisational learning and innovation. To this end, we designed a comprehensive research model (see Fig. 1).

The model includes a total of 5 hypotheses reflecting. This section presents the theoretical support for the proposed research model.

**The influence of digital transformation on organisational learning**

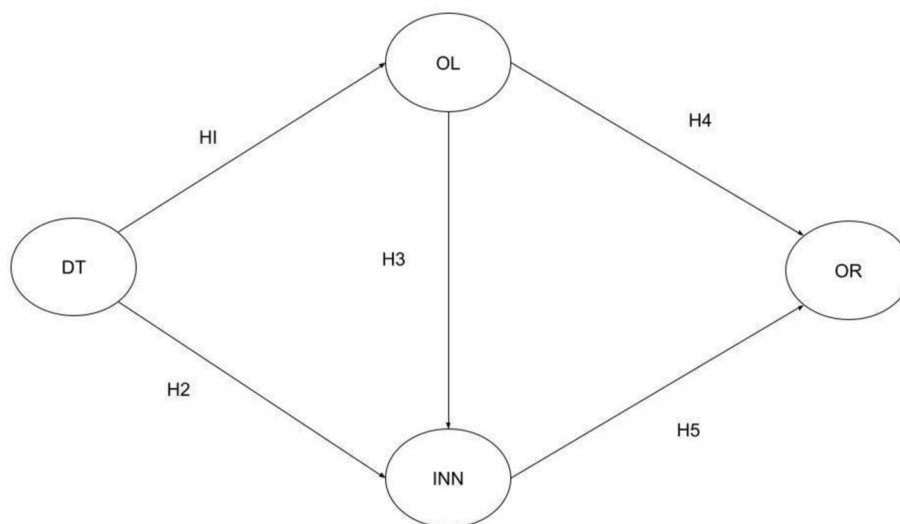
Digital transformation is a broad concept that refers to the integration of digital technologies into the operations of organisations to achieve their organisational goals (Horváth & Szabó, 2019), so DT is seen as a strategic goal for organisations.

As, these digital technologies help improve competitive advantages by leveraging existing company resources and developing new capabilities (Liu et al., 2011). This is only achieved through several structural and organisational changes (Bharadwaj et al., 2013). To integrate digital technologies with organisational capabilities to get the most out of digitisation (Raj et al., 2022).

DT inherently relates to organisational change due to the use of different digital technologies, leading to a change in value creation and consumption patterns (Wessel et al., 2021), as well as a change in business models, and the development of new products, services and business processes (Verhoef et al., 2021).

These digital technologies help improve competitive advantages by leveraging existing corporate resources and developing new capabilities (Liu et al., 2011). This is only achieved through many changes in business strategy. Therefore, the learning process in the light of DT leads companies to assess the extent of their need for this type of transformation and determine the level of knowledge required for its urges (Goh & Richards, 1997).

Organisational learning relates to changes in cognition, beliefs, and behaviour (Easterby-Smith and Prieto, 2000). And a change in organisational knowledge (Fiol & Lyles, 1985). Firms learn by creating and retaining new knowledge and then transferring that knowledge to different units in the firm (Argote & Ingram, 2000) or learning indirectly (Bandura, 1977), from the experience of other units (Easterby-Smith & Prieto, 2008). It refers to the integration of knowledge acquisition and organisational change based on action and their workforce. This is because the learning process is closely related to the



**Fig. 1** Hypothesised model. Source (By Authors). DT: digital transformation, OL: organisational learning, INN: innovation, OR: organisational resilience

creation and use of knowledge within organisations and at all levels from the individual, group and organisational level (Garvin, 2021; Yu, 2004).

From a resource-based view (RBV), firms can recognise the firm's capabilities and resources and its development, and thus seize appropriate market opportunities (Makadok, 2001; Wernerfelt, 1984).

Firms differ in their resources and their ability to use it to create value that differentiates them from their competitors (Roberts & Amit, 2003). Peteraf (1993) presents the idea of creating knowledge in all parts of the company, understanding the environment and changes around the company, and then using this knowledge to develop one's skills in dealing with the environment. The main premise of this theory is the participatory approach, interaction and involvement of information technology workers who direct and enhance learning (Jarrahi & Sawyer, 2013).

Provided that the old knowledge is used to apply the new knowledge, because the knowledge accumulated by the firm can develop the appropriate viability of the firm, so the firm can benefit from the new knowledge and create value (Cohen & Levinthal, 1990). Where OL is a long-term change in organisational behaviour (Fiol & Lyles, 1985), that is critical to fostering the change process (Lozano, 2011).

OL considered an important driver in the development of new products and services that adapt to technological evolution, maintain competitive advantage, and respond to customer demands, since knowledge can maintain competitive advantage and continuity in the face of the uncertainty and ambiguity inherent in times of crisis (Dekoulou & Trivellas, 2014).

In addition to the fact that the use of these technologies has behavioural and structural effects on knowledge management, the DT with its various technologies contributes to behavioural change by improving human interaction in companies, thus contributing to the constant transmission and development of knowledge, such as Structural effects, these transformations facilitate the process of accessing internal or external sources of knowledge and thus facilitate their development (Vega-Jurado et al., 2009). While they are structural influencers, they excel at understanding how SMEs can adapt and respond to the demands of a new society and how they can use digital technologies to rethink their operations and business models (Ebert & Duarte, 2018; Leão & Silva, 2021) and preparing best for potential new crises (Ravindran & Boh, 2020).

On the two sides of the DT that we discuss in this study, social media facilitates the process of accessing knowledge and its various sources, in addition to its contribution to enhancing the learning process and making it open and available to everyone, be it an individual or institutional process. On the other hand, the learning process contributes to the adaptation of these means. In order to achieve corporate goals and the process of adapting business models (Razmerita et al., 2014).

However, integrating digital technologies into business strategies is not easy, especially for small and medium-sized businesses that lack the experience and human skills to adopt these technologies, in addition to the need to find ways to modify and adapt these technologies. DT is constantly evolving, keeping pace with digital development, and new technologies require companies to be able to continue the process of learning and acquiring new knowledge and skills. This means that the learning process is continuous and the ability of the DT process to deliver the required value. OL is closely related

to knowledge management, where knowledge management aims to develop the effectiveness of the organisation and its members, and OL improves the cycle of knowledge formation and information management, which helps improve the level of response to extraordinary circumstances and dynamic change and reduce uncertainties (Chiva et al., 2013).

This shows that knowledge management is crucial to understand the new data imposed by the crisis and to adapt transformation technologies to new market demands, thus contributing to the formation of a normative strategic approach, able to meet new consumption patterns and a comprehensive overview obtain about supply and demand (Ravindran & Boh, 2020). Knowledge management is an essential aspect of the transformation process and helps to create awareness and predictability in uncertain situations, increasing the ability of SMEs to deal with such crises (Arkan, 2016; Klein & Todesco, 2021) and to be better prepared for potential new crises (Ravindran & Boh, 2020). We therefore formulate the following hypothesis:

H1: Digital transformation has a positive impact on organisational learning in SMEs.

### **The influence of digital transformation on innovation**

In recent years, digital transformation (DT), has become a widespread phenomenon (Fitzgerald, 2013). Since the mid-twentieth century, digital technologies such as smart devices, social media, advanced analytics, machine learning, the Internet of Things, artificial intelligence, etc., have become a major player in the business world. DT describes organisational changes and transformations based on these technologies (Wahyudiono et al., 2024).

According to Fitzgerald (2013), DT focuses on integrating these technologies into the business world, and the goal of this transformation is to achieve improvements in business functions related to customer experience, to facilitate key processes, and to develop or create new business models. Vial (2019, p. 118), described it as “A process aimed at improving an entity by making significant changes in its characteristics through combinations of configuration, computing, communications and connectivity technologies.”

Businesses have increasingly adopted digital transformation in the Covid-19 period as a way to improve their ability to withstand the shocks of the pandemic, because businesses become more resilient by embracing DT as a strategy (Barber et al., 2019). While DT impacts entire firms, leads to changes in business processes, and helps companies to gain a competitive advantage by updating or developing their core competencies (Liu et al., 2011), it also enables companies to add value to their customers (von Leipzig et al., 2017).

The concept of DT has regulatory implications for the entire firm as well as the business model where changes are achieved dependent on digital technology (Agarwal et al., 2010; Liu et al., 2011). Enhancing the role of DT, which is about integrating digital technologies into business processes, has become popular during the COVID era due to the need for business continuity and loss reduction (Galindo-Martín et al., 2019), where all corporate websites, electronic applications and social media (e.g. Instagram, Facebook, WhatsApp) help to advertise services and products online. In addition, the use of video conferencing technologies, e-learning and e-commerce and marketing have generated a strong response from small businesses (Ulas, 2019).

These digital technologies are driving changes in the business environment, creating new opportunities and innovative initiatives (Díaz-Chao et al., 2015). Thereby it contributes to the development of supply chains, knowledge transfer and the development of operational efficiencies (Westerman et al., 2014) as well as the creation of new products, services and business processes (Bharadwaj et al., 2013).

According to Guinan et al. (2019), integrating innovation into the DT process requires a wide range of managerial and technical skills and leads to either significant or discontinuous changes in technology-dependent production processes (Damanpour & Gopalakrishnan, 1998; Hagedoorn, 1996). Innovation is the term used to describe the changes in the economy brought about by the use of new technologies and technologies in production processes. These changes may involve the development of new goods, services, markets, manufacturing methods, sources of supply and business models (Cefis and Marsili, 2005). Changes in management, in technology or in the digital area can also be described as innovations.

Innovation is seen as a tool for surviving in turbulent markets, as it helps produce goods and services suited to new markets. Therefore, innovation is the main driver for changes in the transformation process in different phases, depending on the preservation of the digital sources (Matzler et al., 2018). Nambisan et al. (2017) emphasised that there are links between developments in goods and services, business models and DT.

Furthermore, dynamic management capabilities (Helfat & Peteraf, 2014) are vital for scenario planning to acquire insights into unforeseen goals, and it is feasible to predict possibilities, have a clearer picture, and push cognitive boundaries by employing digital tools (Hollan et al., 2000).

Accordingly, dynamic capabilities are key contributors to the change and transformation process and help to make the most of new opportunities and ideas (Zollo & Winter, 2002). Hence, dynamic skills are an essential part of the innovation process as they contribute to access to new information (Nelson and Winter, 1982; March, 1991). Because innovation is based on experimentation and exploration based on available sources and requires a high level of diversity (March, 1991). Dynamic skills also depend on the speed of knowledge generation (Ambrosini & Bowman, 2009). This shows that there is a link between innovation and dynamic skills, leading to the use of dynamic skills in innovation contexts.

Additionally, paying attention to the innovation process as well as defining the company's strategic vision and managing its operations in order to draw attention to commercialisation are important response actions to absorb and incorporate digital technologies into digital organisational changes (Fitzgerald, 2013).

Social media and digital technologies are essential to the digitisation of communication and distribution channels because they have a direct and indirect impact on the innovation process that supports the different phases of the digital transformation. Companies must use these resources to enter the market, concentrate on customers and their needs, and avoid complexity (Muninger et al., 2019). The DT process, whether it be in operations or interpersonal interactions, offers a variety of alternatives and strategic methods to deal with problems and encourage creativity. The interaction and integration of digital components are necessary for this (Huang et al., 2017).

Due to the fact that the digital innovation strategy is founded on three elements—digital platforms, digital infrastructures, and digital manufacturers (Yoo et al., 2010). As transformation delivery is typically characterised as a collection of activities driven by digital services and products as well as business model innovations, it becomes evident that digital transformation requires innovation at all phases (Matt et al., 2015; Vogel-sang et al., 2018). As businesses innovate to adapt to change, engage customers and meet their needs, as well as improve business portfolios, thus unifying sustained long-term business plan. Digital transformation has been a creative response to meet customer needs, maintain business sustainability, and competitive advantages (Damanpour & Gopalakrishnan, 1998; Roberts & Amit, 2003; Weber & Tarba, 2014).

Thus, it is evident that the digital transformation in various industries and stages depends on the creation of new values for both customers and employees, and primarily depends on technological advancement, innovation, and changing business practices (Li, 2020). It is also linked to the speed of transformation, the scale of business responses to consumer demands, and is known by digital technologies and management decisions that depend on digital data, among other factors (Agarwal et al., 2010).

This indicates (Westerman et al., 2014) that companies have managed to use their resources to generate revenue when implementing digital transformation. Therefore, innovation is seen as an urgent need for survival. Finally, it uses modern technologies and practical applications, as well as new management methods and practices. Hennings found that the results of digital transformation are a cumulative effect of digital innovations (Hinings et al., 2018). Innovations in products and services, together with digital business models, form the basis for the change process of digital transformation and organisational changes (Matt et al., 2015). We therefore hypothesise that:

H2: Digital transformation has a positive impact on innovation in SMEs.

### **The influence of organisational learning on organisational innovation**

Organisational learning significantly enhances a firm's responsiveness and capability to develop competitive products, services, and processes (Cefis & Marsili, 2005). This improvement stems from learning's ability to foster creativity, leverage knowledge for innovation, and utilise organisational intelligence (García-Morales et al., 2007). Innovation is promoted through learning and requires enhancing a company's capabilities and resources to improve its offerings (Migdadi, 2019), thereby boosting competitiveness (Szeto, 2000).

The learning process involves the creation, transfer, and retention of knowledge within the firm, driven by its ability to innovate and leverage organisational learning (Brockman & Morgan, 2003). Dynamic capability theory is essential for explaining the relationship between organisational learning and innovation. This theory emphasises a firm's ability to integrate, build, and reconfigure internal and external resources and competencies to adapt to rapidly changing environments (Teece et al., 2016). This capability reflects a company's proficiency in initiating and implementing innovative ideas through continuous learning processes and path-dependent histories. A company's learning ability directly influences its capacity to adopt and execute innovative practices more swiftly than competitors.



Organisations must identify the appropriate type of learning for their specific situation. Single-loop learning focuses on maintaining existing strategies and goals while addressing problems, whereas double-loop learning involves altering goals and standards as errors are detected and corrected (Chan et al., 2023). This distinction is achieved by specifying the necessary type of knowledge, whether for radical or incremental changes, or for systematic or innovative thinking, to ensure innovative improvements (Francis & Bessant, 2005). Innovation should enhance learning and knowledge management processes to enable, guide, and reinforce them in various forms (Bolívar-Ramos et al., 2012). Utilising this knowledge to develop products that meet market demands generates new knowledge, necessitating a continuous learning and knowledge management process to develop and disseminate these innovations (Rupietta et al., 2021). On the basis of these considerations, we formulate the following hypothesis:

H3: Organisational learning has a positive impact on innovation in SMEs.

#### **The influence of organisational learning on organisational resilience**

Organisational learning is based on the acquisition of knowledge from both the internal and external environment, and this acquired knowledge is translated into part of the organisation's knowledge system (Chiva et al., 2013). Utilisation of this knowledge and its appropriate distribution or retention in organisational memory for future use and hence utilisation in the organisational capabilities that increase the firm's competitive advantage (Crossan & Berdrow, 2003).

Organisational learning aims to achieve a competitive advantage for learning organisations by gathering knowledge from all stages and integrating it into the learning process for effective employee growth and learning, where organisational learning is defined as the ability to transfer learning. The process from the individual and group level to the organisation involves four practical steps of organisational learning: knowledge acquisition, sharing, interpretation, and retention in organisational memory to maintain performance and competitive advantage, allowing the organisation that learns faster to outperform its competitors. Additionally, the importance of learning in fostering a culture of creativity and experimentation in organisations has been highlighted (Kafashpoor et al., 2013; Vakola & Rezgui, 2000).

The resource-based view is based on the use of resources to introduce new products, services and processes and to achieve competitive advantage (Ray et al., 2003). Furthermore, a dynamic skill depends on its organisational context and on its valuable, rare, and unique skills and core competencies rather than on its static resources (Newbert, 2006). Therefore, OL ability is considered important for resilience (Bahadur et al., 2013).

Organisational resilience is the ability of organisations to anticipate, prepare for, respond to, adapt to, and recover from sudden changes and disruptions (Hillmann & Guenther, 2020). Also, OR refers to the ability of organisations to recover, manage, adapt, and absorb change (Vogus & Sutcliffe, 2007). They can be developed through various organisational resources such as structure, practices, cognition and behaviour (Lengnick-Hall et al., 2011; Markman & Venzin, 2014).

As highlighted by Vogus and Sutcliffe (2007), the knowledge generated through education is a contributor to organisational resilience (Vogus & Sutcliffe, 2007). Ma et al. (2018) suggest that an organisation's ability to think, learn, and grow from disruption

is related to its resilience. Orth and Schuldis (2021) propose that organisations' ability to absorb knowledge and learn from crises increases their resilience and performance. Therefore, propose that learning ability is positively associated with building and maintaining organisational resilience (Do et al., 2022).

There are several main activities arising from learning processes and their different stages, such as from the experiences of others and the smooth transfer of knowledge at all levels within the organisation (Firestone and McElroy, 2005). Therefore, learning is one of the skills that an organisation must have at its disposal to be resilient, along with the ability to react to reality, address critical issues (monitoring) and address skills (anticipation, and these skills will identified and developed through knowledge management (Klein & Todesco, 2021).

Several researchers have developed a framework for organisational resilience that includes recognising threats and ways to respond, adapting, and learning for the future (Bhamra et al., 2011). In addition, organisational skills to face the problem and develop solutions (Duchek, 2019), and after the crisis the organisation learns from it for future events. There is a balance between learning from experiences and new learning acquired in crises (Duchek, 2019). Hence, learning from inputs and outputs is a flexible process (Vogus & Sutcliffe, 2007). On the basis of these considerations, we formulate the following hypothesis:

H4: Organisational learning has a positive impact on organisational resilience in SMEs.

### **The influence of innovation on organisational resilience**

Innovation involves the introduction of new ideas, practices, or materials necessitating collaborative efforts among individuals, teams, or departments within an organisation (Chen & Huang, 2009; Kim & Mauborgne, 1999). Within organisations, collective units pursue common objectives, potentially leading to comparisons and perceptual disparities that could impede innovative behaviours. To address this, fostering a positive organisational climate characterised by aligned perceptions and constructive relationships is crucial (Phongthiya et al., 2024). Such an atmosphere encourages the sharing of knowledge and ideas, thereby facilitating creativity and providing a basis for innovation (Hult et al., 2004; Shipton et al., 2017; Song, 2006).

The Resource-Based View (RBV) regards innovation as valuable resources, encompassing both radical and incremental changes (Baregheh et al., 2009; McKeown et al., 2008). Leveraging this resource enables firms to differentiate themselves from competitors and actively compete in the marketplace, fostering wealth creation and economic dynamism (Crick & Crick, 2023). This relies on the integration and exchange of knowledge across organisational units, fostering creativity and laying the groundwork for further innovation (Hult et al., 2004; Shipton et al., 2017; Song, 2006). Driven by the objective of enhancing performance and effectiveness (Rosenbusch et al., 2011), innovation is vital for organisations to navigate dynamic and competitive markets while adapting to evolving customer preferences. Typically, innovative organisations experience significant growth in profits and performance (Davila et al., 2009).

Moreover, innovation enhances a firm's resilience by aligning with market developments and stimulating continuous creativity and problem-solving (Nikpour, 2017). Both

resilience and innovation are characterised by their capacity to manage uncertainty (Lengnick-Hall et al., 2011).

Furthermore, innovation enables organisations to cultivate new learning, implement novel processes, and optimise resource utilisation in uncertain environments (Duchek, 2019). It enhances an organisation's ability to respond promptly to customer demands and maintain a competitive advantage through the efficient development of new products and processes (Castellacci, 2015). Consequently, innovation plays a crucial role in fostering organisational resilience (Carvalho et al., 2016; Davila et al., 2009). Based on these considerations, we propose the following hypothesis:

H5: Innovation has a positive impact on organisational resilience in SMEs.

## Research methods and results

### Sample and procedure

The data collection process gathered information from 259 SMEs located in the province of Andalusia, Spain, from February to September 2020. During this period, businesses endeavoured to endure and support their communities. Many firms utilised social media for customer communication and adopted digital technologies to transform their operations. However, some encountered difficulties in this transition due to inadequate human and technical skills or resistance to change (Klein & Todesco, 2021).

Spain was selected due to its significant role in the European economy, with a well-developed market fully integrated into the European Union. Andalusia, in particular, was chosen for its robust initiatives promoting innovation and its reputation as a prime location for investment in research and development (R&D) (Asensio, 2022).

Given the varied digital capabilities, understanding how digital transformation impacts SME resilience is essential. Our sample comprised businesses from diverse service and manufacturing sectors, including information technology, real estate, consulting, construction, accounting, and healthcare. We obtained 259 valid responses. Prior to data collection, general managers, academics, and consultants with expertise in complexity, information systems, and social media reviewed the survey for content, wording, and clarity. Based on their feedback, the questionnaire was revised and pre-tested with 376 participants, achieving a response rate of 68.88% from 259 respondents (Table 1). Business owners, who possess comprehensive insights into their companies and their strategies concerning information systems and social media, constituted 57.1% of the respondents (Baer & Frese, 2002).

To enhance the response rate, a summary report of the study's findings was provided to participants. Individual responses were kept strictly confidential, and data were presented at an aggregated level to mitigate desirability bias. To assess non-response bias, we examined potential differences between early and late respondents. The analysis revealed no significant differences or evidence of systemic bias, indicating that non-response bias did not significantly impact the study's findings (Filion, 1975).

To ensure the validity of the questionnaire, several experts—including academics, consultants, and managers—evaluated the items for clarity, comprehensibility, and content. Based on their feedback, the questionnaire was revised. Subsequently, a pilot test was conducted with 20 general managers, and the resulting changes were incorporated into the final version of the questionnaire.

**Table 1** Technical details of the research

Geographical location	Spain (Andalusia)
Methodology	Structured questionnaire
Universe of population	15,862 firms
Sample size (response size)	376 firms (259 firms, 68.88%)
Sample error	5%
Confidence level	95%, $p-q=0.50$ ; $z=1.96$
Period of data collection	September 2020

## Measures

### *Digital transformation*

The research used five items developed by Nasiri et al. (2020). These items have been duly adapted to the present study. A seven-point Likert scale (1 “totally disagree”, 7 “totally agree”) to measure digital transformation. CFA ( $\chi^2_3=5,390$ , NFI=0.99, NNFI=0.99, GFI=0.99, CFI=0.99) showed that the scale was one-dimensional and had validity and reliability.

### *Organisational learning*

This study used a seven-point Likert scale (1 “totally disagree”, 7 “totally agree”) of four items developed by Aragón-Correa et al. (2007) and García-Morales et al. (2007) to measure Organisational learning. These items were adapted to the present study. We performed CFA to validate the scale ( $\chi^2_1=1,285$ , NFI=0.99, NNFI=0.99, GFI=0.99, CFI=0.99), which demonstrated its one-dimensionality, validity, and reliability.

### *Innovation*

Many researchers analyse organisational innovation using reliable, valid scales that allow it to be measured. Drawing on a previous scale of Zahra (1993), we designed a four-item scale (1 “Totally disagree”, 7 “Totally agree”) to measure the construct. ( $\chi^2_2=2,881$ , NFI=0.99, NNFI=0.98, GFI=0.99, CFI=0.98, IFI=0.99). This procedure yields a selection of 14 items.

### *Organisational resilience*

The study uses a scale of 12 developed by Blanco et al. (2017) and Notario-Pacheco et al. (2011), based on the original scale made by Connor and Davidson (2003). (1 “totally disagree”, 7 “totally agree”). These items are duly adapted to the present study. The authors develop a confirmatory factor analysis to validate the scales ( $\chi^2_{11}=12,602$ , NFI=0.99, NNFI=0.98, GFI=0.99, CFI=0.99, IFI=0.99) and show that the scale is one-dimensional and has adequate validity and reliability ( $\alpha=0.71$ ).

## Results

This section presents the main research results. First, Table 2 shows the means and standard deviations, as well as the inter-factor correlation matrix for the study variables. Significant and positive correlations exist among digital transformational, organisational learning, innovation and organisational resilience.

Additionally, we find that there is a positive association between Job position, organisational resilience, learning, innovation and digital transformation. Digital transformation is a strategic choice for organisations as it impacts business operations and customer experience or creates new ways of working (Weber & Tarba, 2014). Also, the trend and adoption of digital transformation is helping organisations survive, thrive by leveraging the resources and processes needed to improve performance and gain competitiveness advantage (Viswanathan & Telukdarie, 2021).

First, we analysed the psychometric properties of the measures used in this study (Table 3), the constructs display satisfactory levels of reliability, since the composite reliabilities range from 0.93 to 0.95 and the shared variance coefficients from 0.66 to 0.77 was higher than the recommended minimum value of 0.50 (Fornell & Larcker, 1981). All factor loadings were significant ( $t > 13.71$ ) and took values higher than the recommended threshold ( $\lambda > 0.70$ ). Additionally, exploratory factor analysis was conducted for all items in the scale. A single factor emerged for each of the proposed constructs, supporting evidence of their one-dimensionality.

Digital transformation has a positive relationship with organisational learning. As shown in (Model 1), ( $\beta = 0.445$ ,  $p < 0.001$ ), it constitutes 21.3% of the variance in the OL. This indicates that digital transformation contributes to enhancing organisational learning and the company's ability to survive and adopt changes (see Table 4).

In the second model, it was shown that DT would be positively correlated with INN ( $\beta = 0.460$ ;  $p < 0.05$ ), where it accounts for 18% of the variance in INN. Therefore, H1 and H2 are supported. Also, (Model 3) shows that OL was positively related to INN ( $\beta 0.637$ ,  $p < 0.01$ ) and accounted for 34.3% of the variance of innovation. As a result, H3 is supported. H4 suggests that OL will be positively related to OR. As shown in (Model 4), OL ( $\beta 0.381$ ;  $p < 0.05$ ) had a significant positive relationship to OR and accounted for 30.1% of the variance in OR. Also, as shown in (Model 5), INN was positively related to OR ( $\beta 0.432$ ;  $p < 0.05$ ) it constitutes 49% of the variance in the OR. Thus, H4 and H5 are supported.

## Discussion

The aim of this study was to enhance the current understanding of digital transformation and its role in enhancing organisational resilience.

This goal was driven by the need for an integrated perspective that would give insight into how organisations are dealing with the turbulent environment, where the COVID-19 pandemic and the current environmental disruptions have fundamentally changed the way companies compete (Johnson et al., 2020), and companies that want to maintain their profitability and performance must adapt digital transformation based on the incorporation of digital technologies into all units of the company to create new business, new products or services or to work on the development of existing ones. Also,

**Table 2** Means, standard deviations and correlations

Descriptive statistics	Mean	Std. deviation	Level of studies	Job position	Working years	Business owner	Innovation	DT	OL	OR
Level of studies	2.757	0.473	1							
Job position	2.537	1.005	- 0.165**	1						
working years	3.158	0.945	- 0.130*	- 0.163**	1					
Business owner	3.583	2.480	0.028	- 0.273	0.207**	1				
Innovation	4.686	1.315	- 0.002	0.194**	- 0.142*	- 0.055	1			
Digital transformation	4.268	1.032	- 0.010	0.062	- 0.099	0.040	0.379**	1		
Organisational learning	5.141	1.149	0.118	0.136*	- 0.167**	- 0.055	0.571**	0.415**	1	
organisational resilience	5.413	.8146	0.270	0.131*	- 0.107	- 0.087	0.698**	0.376**	0.253**	1

SD, standard deviation

\*\* Correlation is significant at the 0.01 level (2-tailed)

\* Correlation is significant at the 0.05 level (2-tailed)

improving culture and customer experiences to meet changing business and market needs. It does this through the process of organisational learning supported by digital technologies to access new knowledge, analyse it, interpret it correctly and use it, as well as innovation enhanced by this technology when changes and innovations in products, services or business processes occur that lead to the development of the current business model or the transition to a new one.

As innovation and digital transformation influence each other, innovation through the use of digital technologies leads to a better understanding of the market and consumer needs. This increases the company’s ability to generate growth and profits (Pesce et al., 2019). In addition, this process helps increase organisational resilience, especially when incorporating knowledge management and information transfer into this model, which increases competitiveness (Namdarian et al., 2020). An organisation’s ability to learn is positively reflected in its resilience and responsiveness to change (Duchek, 2019), as well as its use of new insights and precedents, which help foster organisational innovation (Migdadi, 2019).

Despite the growing research on the role of technology in supporting organisational resilience, we find that empirical evidence is still scarce (Robertson et al., 2022; Matos, 2022; Sgobbi & Codara, 2022). Our study aims to shed light on the role of digital transformation in enhancing organisational resilience through innovation and organisational learning. To finally arrive at a business model that can be applied in small and medium-sized enterprises to make the most of digital technologies and their interactions with innovation and penetration. To achieve effective and high resilience to keep up with all changes and shocks. From the perspective of a dynamic, capability- and resource-based view for the enterprise (RBV), the results demonstrate that digital transformation can be used to facilitate organisational resilience and that there is a possible mediation of both organisational innovation and learning to support the company’s competitiveness and survival. Research results have positive effects for both scientists and practitioners.

**Table 3** Validity, reliability and internal consistency

		$\lambda^*$	R2	A. M
DT1	0.876	0.767376	0.232624	$\alpha = 0.908$
DT2	0.874	0.763876	0.236124	C.R.0.944
DT3	0.861	0.741321	0.258679	S.V. = 0.705
DT4	0.854	0.729316	0.270684	
DT5	0.726	0.527076	0.472924	
OL1	0.862	0.743044	0.256956	$\alpha = 0.874$
OL2	0.888	0.788544	0.211456	C.R.0.939
OL3	0.911	0.829921	0.170079	S.V. = 0.793
OL4	0.902	0.813604	0.186396	
INN1	0.776	0.602176	0.397824	$\alpha = 0.869$
INN2	0.844	0.712336	0.287664	C.R.0.924
INN3	0.851	0.724201	0.275799	S.V. = 0.674
INN4	0.813	0.660969	0.339031	
OR6	0.758	0.574564	0.425436	$\alpha = 917$
OR7	0.734	0.538756	0.461244	C.R.0.954
OR8	0.795	0.632025	0.367975	S.V. = 0.669
OR9	0.876	0.767376	0.232624	
OR10	0.891	0.793881	0.206119	
OR11	0.847	0.717409	0.282591	
OR12	0.816	0.66586	0.33414	

$\lambda^*$ , standardised structural coefficient; R2, reliability;  $\alpha$ , Cronbach Alpha; C. R., compound reliability; SV, shared variance; f. p, fixed parameter; A. M, adjustment measurements

\*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$  (two-tailed)

### Implications for theory

This study makes many theoretical contributions in the field of academic management. In this research, this study presented an overview of the impact of digital transformation and how Covid-19 has forced companies to begin the rapid transition to digital transformation. Most of the current research focuses on the impact of digital transformation on performance and competitive advantage (Leão & Silva, 2021) and business model innovation (Gil-Gomez et al., 2020). This study investigates how digital transformation facilitates organisational innovation, learning, and organisational resilience using dynamic capacity theory. Researchers are currently studying Building Organisational Resilience on the Foundation of Digital Transformation (Do et al., 2022), this study uses regression analysis to discover the positive impact of digital transformation on organisational resilience through organisational innovation and learning. Through a qualitative comparison and analysis of the available data, it was found that digital transformation is an important prerequisite for reaching organisational resilience, innovation and organisational learning. Digital transformation based on these two factors helps companies achieve structured and high organisational resilience. Managers must use these techniques to help improve the communication process and thus support competitive advantages and better take advantage of market opportunities (Bhatt & Grover, 2005). In addition, the use of digital technologies enables companies to obtain up-to-date market information and trends, which can be used to quickly identify and respond to changes in customer needs (Setia et al., 2022). In addition, digital transformation enhances the company's

**Table 4** Regression analysis

Independent variables	Organisational learning		Organisational innovation		Organisational resilience		
	Coefficients (t statistics)	TOL (VIF)	Coefficients (t statistics)	TOL (VIF)	Coefficients (t statistics)	TOL (VIF)	
Constant	Model 1 3.313** (3.516)		Model 2 2.288** (2.977)		Model 3 1.628** (2.424)	Model 4 3.659** (8.527)	Model 5 3.417** (9.486)
Level of studies	0.317** (2.269)		0.052** (0.321)		-0.155** (-1.056)	-0.56** (-0.593)	0.043** (0.544)
Job position	0.139** (2.040)		0.219** (2.748)		0.132** (1.920)	0.032** (0.689)	-0.011** (-0.285)
Business owner	0.052*** (0.291)		0.078*** (0.371)		0.040** (0.211)	-0.10** (-0.830)	-0.113** (-1.097)
working years	-0.114** (-1.609)		-0.113** (-1.369)		-0.058** (-0.782)	-0.005** (-0.100)	0.004** (0.091)
DT	0.445** (7.126)	0.988 (1.012)	0.460** (6.307)	0.988 (1.012)			
OL					0.637** (10.622)	0.381** (9.946)	0.946 (1.058)
INN							0.432** (15.146)
R2	0.21		0.18		0.34	0.31	0.49
Adjusted R2	0.19		0.16		0.33	0.28	0.48
F	13.65**		11.074		26.462	21.756	48.577
Standard error	1.02***		1.203**		1.076**	0.68**	0.58**

TOL, tolerance; VIF, variance inflation factor  
 \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$  (two-tailed)



ability to act proactively and develop successful innovations, thanks to advanced technologies that help in acquiring, interpreting and using the knowledge necessary to create innovations that are able to adapt to changing markets. However, adopting and developing digital transformation to improve organisational resilience requires companies to have specific skills and an understanding of what they want to achieve with technology. This results in advantages (in terms of relationship performance). Thirdly, this article contributes knowledge of organisational resilience. On the contrary, due to the lack of empirical studies examining the impact of digital transformation on management, many studies have focused on the impact of digital transformation on supply chain resilience (Tukamuhabwa et al., 2015) and platform ecosystem resilience (Khurana et al., 2022). Organisational resilience helped achieve system efficiency, make appropriate decisions, and maintain the survival of companies. Especially in crises and disruptions such as COVID-19, companies can respond to market changes efficiently, quickly, cost-effectively and without interruption.

Additionally, managers must focus on innovation and learning as they play a critical role in mediating the relationship between digital transformation and organisational resilience. This relationship provides new empirical evidence for organisational intelligence and the ability to use resources. Digital transformation requires using existing skills and exploring new ones (Matt et al., 2015). This paper asserts that the strategic use of digital transformation drives companies to develop dynamic capabilities and deploy all available resources, leading to higher performance.

#### **Implications for practice**

Our study provides important insights for practice. First, the results show that digital transformation is an institutional and organisational transformation that helps to make changes either overall or in specific units of the company through the introduction of new infrastructure based on digital technologies, so digital transformation must be gradual and Strategies, based on the study of the company's transformation needs through the availability of the necessary knowledge, the study of the company's resources and its ability to implement these strategies, and the identification of the aspects that require innovation and their degree, so that the digital transformation occurs a based organised base according to the required organisational changes (Liu et al., 2011). Second, managers need to facilitate the use of digital technologies within organisations and create an organisational context that favours the acquisition and sharing of knowledge. So that it can use its resources to take proactive steps to improve its competitiveness and gain a sustainable competitive advantage (Newbert, 2008). By improving the learning process in the company, this also contributes to innovation. Having encouraged the use of digital technologies within the organisation to transfer knowledge effectively, organisations have been able to innovate more and address the challenges faced by these small and medium-sized businesses. This result occurred particularly when sharing knowledge (Wang & Wang, 2012).

Our results show that organisational learning, resilience, innovation, and digital technologies are essential components for business survival and prosperity. As the new knowledge added to the organisational memory of the company helps to stay current, adaptable and dynamic. This is because organisational learning is essential to improve

organisational performance and maintain a source of competitive advantage (Bolívar-Ramos et al., 2012). As such, this knowledge also contributes to the innovation or development of products, services, and business processes that contribute to competitive advantage.

Where integrating innovation and learning into the process of digital transformation requires many managerial and technical skills (Guinan et al., 2019) and induces either drastic or discontinuous changes in technology-dependent production processes (Damanpour & Daniel Wischnevsky, 2006), where innovation helps to influence SME performance and improve their financial metrics (Ardyan, 2015; O’Cass & Sok, 2013; Oura et al., 2016). Third, organisations must develop measures to increase organisational resilience and positively influence digital transformation. This is because SME managers work effectively to manage crises and turbulence through good management of the company’s resources and improve its dynamic capacity, thereby making informed decisions (Teece et al., 2016). This improves the organisation’s ability to adapt and thrive to perform well in times of crisis (Lee et al., 2013). In addition, SMBs need to develop and resilient their workforces accordingly, while benefiting from digital technologies, learning and innovation.

### **Conclusions and future research**

The current study sheds new light on the connection between digital transformation and organisational resilience. Draw on innovation and organisational learning. First, research shows a positive relationship between digital transformation, organisational learning, and innovation. Where digital technologies provide the means to collect, analyse and transfer knowledge, thus digital transformation defines and drives the organisational learning process and leads to an improvement in organisational performance and an increase in organisational capacity (Wu et al., 2021).

In addition, the article confirmed the existence of a positive association between digital transformation and innovation. While digital transformation refers to the changes that lead to the incorporation of digital technologies into various operations, contributing to changes in the way businesses, products, services, and business processes are conducted (Nambisan et al., 2019; Fitzgerald, 2013).

Innovation is mainly based on the creation and discovery of new ideas, practices, processes, products or services (Daft, 1978), therefore digital transformation supports innovation.

Second, the study confirmed a positive existence between organisational learning and innovation. Organisational learning is a strategic variable for companies trying to launch new products or create new markets, as they need to constantly innovate to survive intense competition (Cefis and Marsili, 2005), as learning fosters creativity and access to, improves the understanding and application of new ideas thus fosters innovation, which takes advantage of this knowledge and applies it to the development of business operations, enabling the organisation to survive and continue.

Finally, the study empirically proves that there is a positive connection between organisational learning, innovation and organisational resilience. As companies that learn and

seek knowledge and improve their receptiveness (Nava, 2022). It allows firms to develop its capacity for innovation and develop its business activities in proportion to the turbulent markets, improving the ability of companies to respond to changes and meet the needs of their customers, giving them competitive advantages and their ability to survive (Alberti et al., 2018).

One limitation of this study is its focus on the digital transformation of SMEs in Andalusia. Future research should expand to include companies from various sectors and a larger sample size. In addition, future research should explore how best to balance the use of digital technologies, and the resulting changes in organisations' culture and performance. Finally, several developments will only accelerate the changes described in this paper. First, the development of digital tools will have major implications for work and organisations. For example, the emergence of machine learning, social media and artificial intelligence and their integration into the organisation's business system will have a significant impact on organisational learning and innovation. This research opportunity promises to connect multiple areas in the digital transformation literature. Second, future research can explore how companies can improve their decision-making process by relying on digital technologies to research the role of digital design tools in reshaping the competitive market and corporate resilience.

#### Abbreviations

DT	Digital transformation
OL	Organisational learning
OR	Organisational resilience
INN	Innovation
SMEs	Small and medium enterprises

#### Acknowledgements

This study was funded by the Excellence Unit "Advanced Research in Economics and Business" of the University of Granada (Spain). It was also supported by the Andalusian Regional Government (projects: B-SEJ-042-UGR18, A-SEJ-192-UGR20, and P20\_00568).

#### Author contributions

Writing and reviewing and analysing data—Jeehan AR Awad. Reviewing and supervision and funding acquisition—Rodrigo Martín Rojas.

#### Availability of data and materials

All data analysed during this study are included in this published article and presented in results. The raw datasets generated during the current study are not publicly available due to sensitivity.

#### Declarations

##### Competing interests

Not applicable.

Received: 4 February 2024 Accepted: 8 July 2024

Published online: 02 October 2024

#### References

- Agarwal, R., et al. (2010). Research commentary—the digital transformation of healthcare: current status and the road ahead. *Information Systems Research*, 21(4), 796–809. <https://doi.org/10.1287/isre.1100.0327>
- Alberti, F., Ferrario, S., & Pizzurno, E. (2018). Resilience: Resources and strategies of SMEs in a new theoretical framework. *International Journal of Learning and Intellectual Capital*, 15(2), 165. <https://doi.org/10.1504/ijlic.2018.091969>
- Ambrosini, V., & Bowman, C. (2009). What are dynamic capabilities and are they a useful construct in strategic management? *International Journal of Management Reviews*, 11(1), 29–49. <https://doi.org/10.1111/j.1468-2370.2008.00251.x>

- Aragón-Correa, J. A., Morales, V. J. G., & Pozo, E. C. (2007). Leadership and organizational learning's role on innovation and performance: Lessons from Spain. *Industrial Marketing Management*, 36(3), 349–359. <https://doi.org/10.1016/j.indmarman.2005.09.006>
- Ardyan, E. (2015). Market sensing capability, entrepreneurial orientation, product innovativeness success, speed to market and SMES performance. *International Journal of Business Intelligence Research*, 6(2), 18–32. <https://doi.org/10.4018/ijbir.2015070102>
- Argote, L., & Ingram, P. (2000). Knowledge transfer: a basis for competitive advantage in firms. *Organizational Behavior and Human Decision Processes*, 82(1), 150–169. <https://doi.org/10.1006/obhd.2000.2893>
- Asensio, C. (2022, February 25). Andalucía es la tercera que más invierte en I+D pero de las últimas en gasto por habitante. *elEconomista.es*. Retrieved from <https://www.eleconomista.es>
- Baer, M., & Frese, M. (2002). Innovation is not enough: Climates for initiative and psychological safety, process innovations, and firm performance. *Journal of Organizational Behavior*, 24(1), 45–68. <https://doi.org/10.1002/job.179>
- Bahadur, A., Ibrahim, M., & Tanner, T. (2013). Characterising resilience: Unpacking the concept for tackling climate change and development. *Climate and Development*, 5(1), 55–65. <https://doi.org/10.1080/17565529.2012.762334>
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84(2), 191–215. <https://doi.org/10.1037/0033-295x.84.2.191>
- Barber, K., Studer, L., & Fattahi, F. (2019). Derivation of enteric neuron lineages from human pluripotent stem cells. *Nature Protocols*, 14(4), 1261–1279. <https://doi.org/10.1038/s41596-019-0141-y>
- Baregheh, A., Rowley, J., & Sambrook, S. (2009). Towards a multidisciplinary definition of innovation. *Management Decision*, 47(8), 1323–1339. <https://doi.org/10.1108/00251740910984578>
- Bhaman, R., Dani, S., & Burnard, K. (2011). Resilience: The concept, a literature review and future directions. *International Journal of Production Research*, 49(18), 5375–5393. <https://doi.org/10.1080/00207543.2011.563826>
- Bharadwaj, A., et al. (2013). Digital Business Strategy: Toward a next generation of insights. *Management Information Systems Quarterly*, 37(2), 471–482. <https://doi.org/10.25300/misq/2013/37:2.3>
- Bhatt, G. D., & Grover, V. (2005). Types of information technology capabilities and their role in competitive advantage: An empirical study. *Journal of Management Information Systems*, 22(2), 253–277. <https://doi.org/10.1080/07421222.2005.11045844>
- Blanco, V., et al. (2017). Spanish validation of the 10-item Connor-Davidson Resilience Scale (CD-RISC 10) with non-professional caregivers. *Aging & Mental Health*, 23(2), 183–188. <https://doi.org/10.1080/13607863.2017.1399340>
- Bolívar-Ramos, M. T., Morales, V. J. G., & García-Sánchez, E. (2012). Technological distinctive competencies and organizational learning: Effects on organizational innovation to improve firm performance. *Journal of Engineering and Technology Management*, 29(3), 331–357. <https://doi.org/10.1016/j.jengtecman.2012.03.006>
- Brockman, B. K., & Morgan, R. M. (2003). The role of existing knowledge in new product innovativeness and performance. *Decision Sciences*, 34(2), 385–419. <https://doi.org/10.1111/1540-5915.02326>
- Bustanza, O. F., et al. (2016). Technological capabilities, resilience capabilities and organizational effectiveness. *International Journal of Human Resource Management*, 30(8), 1370–1392. <https://doi.org/10.1080/09585192.2016.1216878>
- Castellacci, F. (2015). Institutional voids or organizational resilience? Business groups, innovation, and market development in Latin America. *World Development*, 70, 43–58. <https://doi.org/10.1016/j.worlddev.2014.12.014>
- Cefis, E., & Marsili, O. (2005). A matter of life and death: innovation and firm survival. *Industrial and Corporate Change*, 14(6), 1167–1192. <https://doi.org/10.1093/icc/dth081>
- Chan, D. W. M., Sarvari, H., Golestanizadeh, M., & Saka, A. (2023). Evaluating the impact of organizational learning on organizational performance through organizational innovation as a mediating variable: evidence from Iranian construction companies. *International Journal of Construction Management*, 24(9), 921–934. <https://doi.org/10.1080/15623599.2023.2239486>
- Chiva, R., Ghauri, P. N., & Alegre, J. (2013). Organizational Learning, Innovation and Internationalization: A complex system model. *British Journal of Management*, 25(4), 687–705. <https://doi.org/10.1111/1467-8551.12026>
- Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: a new perspective on learning and innovation. *Administrative Science Quarterly*, 35(1), 128. <https://doi.org/10.2307/2393553>
- Crick, J. M., & Crick, D. (2023). With a little help from my friends: The interaction between cooptation, an entrepreneurial orientation and firm performance. *International Journal of Entrepreneurial Behaviour & Research*, 29(4), 965–985. <https://doi.org/10.1108/ijeb-12-2022-1159>
- Crossan, M., & Berdrow, I. (2003). Organizational learning and strategic renewal. *Strategic Management Journal*, 24(11), 1087–1105. <https://doi.org/10.1002/smj.342>
- Daft, R. L. (1978). A dual-core model of organizational innovation. *Academy of Management Journal*, 21(2), 193–210. <https://doi.org/10.2307/255754>
- Damanpour, F., & Gopalakrishnan, S. (1998). Theories of organizational structure and innovation adoption: The role of environmental change. *Journal of Engineering and Technology Management*, 15(1), 1–24. [https://doi.org/10.1016/s0923-4748\(97\)00029-5](https://doi.org/10.1016/s0923-4748(97)00029-5)
- Damanpour, F., & Wischnesky, J. D. (2006). Research on innovation in organizations: Distinguishing innovation-generating from innovation-adopting organizations. *Journal of Engineering and Technology Management*, 23(4), 269–291. <https://doi.org/10.1016/j.jengtecman.2006.08.002>
- Davila, A., Foster, G., & Oyon, D. (2009). Accounting and control, entrepreneurship and innovation: Venturing into new research opportunities. *European Accounting Review*, 18(2), 281–311. <https://doi.org/10.1080/09638180902731455>
- De Carvalho, A. O., et al. (2016). Organizational resilience: A comparative study between innovative and non-innovative companies based on the financial performance analysis. *International Journal of Innovation*, 4(1), 58–69. <https://doi.org/10.5585/iji.v4i1.73>
- Dekoulou, P., & Trivellas, P. (2014). Learning organization in Greek advertising and media industry: A way to face crisis and gain sustainable competitive advantage. *Procedia - Social and Behavioral Sciences*, 148, 338–347. <https://doi.org/10.1016/j.sbspro.2014.07.051>
- Díaz-Chao, Á., Sainz, J., & Torrent-Sellens, J. (2015). ICT, innovation, and firm productivity: New evidence from small local firms. *Journal of Business Research*, 68(7), 1439–1444. <https://doi.org/10.1016/j.jbusres.2015.01.030>

- Do, H., et al. (2022). Building organizational resilience, innovation through resource-based management initiatives, organizational learning and environmental dynamism. *Journal of Business Research*, 141, 808–821. <https://doi.org/10.1016/j.jbusres.2021.11.090>
- Duchek, S. (2019). Organizational resilience: A capability-based conceptualization. *Business Research*, 13(1), 215–246. <https://doi.org/10.1007/s40685-019-0085-7>
- Dwyer, S. M., et al. (2021). Building organizational resilience: How digital transformation creates value in a crisis. *Proceedings - Academy of Management*, 1, 15980. <https://doi.org/10.5465/ambpp.2021.15980abstract>
- Easterby-Smith, M., & Prieto, I. M. (2008). Dynamic capabilities and knowledge management: An integrative role for learning? *British Journal of Management*, 19(3), 235–249. <https://doi.org/10.1111/j.1467-8551.2007.00543.x>
- Ebert, C., & Duarte, C. H. C. (2018). Digital transformation. *IEEE Software*, 35(4), 16–21. <https://doi.org/10.1109/ms.2018.2801537>
- Faruquee, M., Paulraj, A., & Irawan, C. A. (2021). Strategic supplier relationships and supply chain resilience: Is digital transformation that precludes trust beneficial? *International Journal of Operations & Production Management*, 41(7), 1192–1219. <https://doi.org/10.1108/ijopm-10-2020-0702>
- Filion, F. L. (1975). Estimating bias due to nonresponse in mail surveys. *Public Opinion Quarterly*, 39(4), 482. <https://doi.org/10.1086/268245>
- Fiol, C. M., & Lyles, M. A. (1985). Organizational learning. *Academy of Management Review*, 10(4), 803–813. <https://doi.org/10.5465/amr.1985.4279103>
- Firestone, J. M., & McElroy, M. W. (2005). Doing knowledge management. *The Learning Organization*, 12(2), 189–212. <https://doi.org/10.1108/09696470510583557>
- Fornell, C., & Larcker, D. F. (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics. *Journal of Marketing Research*, 18(3), 382. <https://doi.org/10.2307/3150980>
- Francis, D., & Bessant, J. (2005). Targeting innovation and implications for capability development. *Technovation*, 25(3), 171–183. <https://doi.org/10.1016/j.technovation.2004.03.004>
- García-Morales, V. J., Moreno, A. R., & Montes, F. J. L. (2007). Effects of technology absorptive capacity and technology proactivity on organizational learning, innovation and performance: An Empirical examination. *Technology Analysis & Strategic Management*, 19(4), 527–558. <https://doi.org/10.1080/09537320701403540>
- Garvin, D.A. (2021). *Is yours a learning organization?* <https://hbr.org/2008/03/is-yours-a-learning-organization>
- Goh, S. C., & Richards, G. (1997). Benchmarking the learning capability of organizations. *European Management Journal*, 15(5), 575–583. [https://doi.org/10.1016/s0263-2373\(97\)00036-4](https://doi.org/10.1016/s0263-2373(97)00036-4)
- Guinan, P. J., Parise, S., & Langowitz, N. S. (2019). Creating an innovative digital project team: Levers to enable digital transformation. *Business Horizons*, 62(6), 717–727. <https://doi.org/10.1016/j.bushor.2019.07.005>
- Hagedoorn, J. (1996). Innovation and entrepreneurship: Schumpeter revisited. *Industrial and Corporate Change*, 5(3), 883–896. <https://doi.org/10.1093/icc/5.3.883>
- Helfat, C. E., & Peteraf, M. A. (2014). Managerial cognitive capabilities and the microfoundations of dynamic capabilities. *Strategic Management Journal*, 36(6), 831–850. <https://doi.org/10.1002/smj.2247>
- Hillmann, J., & Guenther, E. (2020). Organizational resilience: A valuable construct for management research? *International Journal of Management Reviews*, 23(1), 7–44. <https://doi.org/10.1111/ijmr.12239>
- Hinings, B., Gegenhuber, T., & Greenwood, R. (2018). Digital innovation and transformation: An institutional perspective. *Information and Organization*, 28(1), 52–61. <https://doi.org/10.1016/j.infoandorg.2018.02.004>
- Hollan, J. D., Hutchins, E., & Kirsh, D. (2000). Distributed cognition. *ACM Transactions on Computer-Human Interaction*, 7(2), 174–196. <https://doi.org/10.1145/353485.353487>
- Horváth, D., & Szabó, R. Z. (2019). Driving forces and barriers of Industry 4.0: Do multinational and small and medium-sized companies have equal opportunities? *Technological Forecasting and Social Change*, 146, 119–132. <https://doi.org/10.1016/j.techfore.2019.05.021>
- Huang, J. C., et al. (2017). Growing on Steroids: Rapidly scaling the user base of digital ventures through digital innovation. *Management Information Systems Quarterly*, 41(1), 301–314. <https://doi.org/10.25300/misq/2017/41.1.16>
- Hurley, R. F., & Hult, G. T. M. (1998). Innovation, market orientation, and organizational learning: An integration and empirical examination. *Journal of Marketing*, 62(3), 42–54. <https://doi.org/10.1177/002224299806200303>
- Jarrahi, M. H., & Sawyer, S. (2013). Social technologies, informal knowledge practices, and the enterprise. *Journal of Organizational Computing and Electronic Commerce*, 23(1–2), 110–137. <https://doi.org/10.1080/10919392.2013.748613>
- Johnson, A. F., Rauhaus, B. M., & Webb-Farley, K. (2020). The COVID-19 pandemic: A challenge for US nonprofits' financial stability. *Journal of Public Budgeting, Accounting & Financial Management*, 33(1), 33–46. <https://doi.org/10.1108/jpbafm-06-2020-0076>
- Kafashpoor, A., et al. (2013). A study on mediating role of organizational learning on relationship between market orientation and organizational performance. *Management Science Letters*, 3(7), 1967–1976. <https://doi.org/10.5267/j.msl.2013.06.029>
- Kantur, D. (2015). Measuring organizational resilience: A scale development. *Journal of Business, Economics and Finance*, 4(3), 456. <https://doi.org/10.17261/pressacademia.2015313066>
- Khurana, I., Dutta, D. K., & Ghura, A. S. (2022). SMEs and digital transformation during a crisis: The emergence of resilience as a second-order dynamic capability in an entrepreneurial ecosystem. *Journal of Business Research*, 150, 623–641. <https://doi.org/10.1016/j.jbusres.2022.06.048>
- Klein, V., & Todesco, J. L. (2021). COVID-19 crisis and SMEs responses: The role of digital transformation. *Knowledge and Process Management*, 28(2), 117–133. <https://doi.org/10.1002/kpm.1660>
- Leão, P., & Da Silva, M. M. (2021). Impacts of digital transformation on firms' competitive advantages: A systematic literature review. *Strategic Change*, 30(5), 421–441. <https://doi.org/10.1002/jsc.2459>
- Lengnick-Hall, C. A., Beck, T. E., & Lengnick-Hall, M. L. (2011). Developing a capacity for organizational resilience through strategic human resource management. *Human Resource Management Review*, 21(3), 243–255. <https://doi.org/10.1016/j.hrmr.2010.07.001>
- Li, F. (2020). Leading digital transformation: Three emerging approaches for managing the transition. *International Journal of Operations & Production Management*, 40(6), 809–817. <https://doi.org/10.1108/ijopm-04-2020-0202>

- Liu, D.-Y., Chen, S., & Chou, T.-C. (2011). Resource fit in digital transformation. *Management Decision*, 49(10), 1728–1742. <https://doi.org/10.1108/00251741111183852>
- Liu, Y., & Yin, J. (2020). Stakeholder relationships and organizational resilience. *Management and Organization Review*, 16(5), 986–990. <https://doi.org/10.1017/mor.2020.58>
- Lozano, R. (2011). Creativity and organizational learning as means to foster sustainability. *Sustainable Development*, 22(3), 205–216. <https://doi.org/10.1002/sd.540>
- Ma, Z., Xiao, L., & Yin, J. (2018). Toward a dynamic model of organizational resilience. *Nankai Business Review International*, 9(3), 246–263. <https://doi.org/10.1108/nbri-07-2017-0041>
- Makadok, R. (2001). Toward a synthesis of the resource-based and dynamic-capability views of rent creation. *Strategic Management Journal*, 22(5), 387–401. <https://doi.org/10.1002/smj.158>
- March, J. G. (1991). Exploration and exploitation in organizational learning. *Organization Science*, 2(1), 71–87. <https://doi.org/10.1287/orsc.2.1.71>
- Markman, G. M., & Venzin, M. (2014). Resilience: Lessons from banks that have braved the economic crisis—and from those that have not. *International Business Review*, 23(6), 1096–1107. <https://doi.org/10.1016/j.ibusrev.2014.06.013>
- Martín, M. A. G., Castaño-Martínez, M.-S., & Méndez-Picazo, M.-T. (2019). Digital transformation, digital dividends and entrepreneurship: A quantitative analysis. *Journal of Business Research*, 101, 522–527. <https://doi.org/10.1016/j.jbusres.2018.12.014>
- Matos, F., et al. (2022). Organisational resilience in the digital age: management strategies and practices. *Contributions to Management Science*. [https://doi.org/10.1007/978-3-030-85954-1\\_5](https://doi.org/10.1007/978-3-030-85954-1_5)
- Matt, C., Hess, T., & Benlian, A. (2015). Digital transformation strategies. *Business & Information Systems Engineering*, 57(5), 339–343. <https://doi.org/10.1007/s12599-015-0401-5>
- Matzler, K., et al. (2018). The crusade of digital disruption. *Journal of Business Strategy*, 39(6), 13–20. <https://doi.org/10.1108/jbs-12-2017-0187>
- Mezias, S. J., & Glynn, M. A. (1993). The three faces of corporate renewal: Institution, revolution, and evolution. *Strategic Management Journal*, 14(2), 77–101. <https://doi.org/10.1002/smj.4250140202>
- Migdadi, M. M. (2019). Organizational learning capability, innovation and organizational performance. *European Journal of Innovation Management*, 24(1), 151–172. <https://doi.org/10.1108/ejim-11-2018-0246>
- Muninger, M.-I., Hammedi, W., & Mahr, D. (2019). The value of social media for innovation: A capability perspective. *Journal of Business Research*, 95, 116–127. <https://doi.org/10.1016/j.jbusres.2018.10.012>
- Nambisan, S., et al. (2017). Digital innovation management: Reinventing innovation management research in a digital world. *Management Information Systems Quarterly*, 41(1), 223–238. <https://doi.org/10.25300/misq/2017/41:1.03>
- Nambisan, S., Wright, M., & Feldman, M. P. (2019). The digital transformation of innovation and entrepreneurship: Progress, challenges and key themes. *Research Policy*, 48(8), 103773. <https://doi.org/10.1016/j.respol.2019.03.018>
- Namdarian, L., Sajedinejad, A., & Bahanesteh, S. (2020). The impact of knowledge management on organizational performance: A structural equation modeling study. *AD-Minister*, 37, 85–108. <https://doi.org/10.17230/ad-minister.37.4>
- Nasiri, M., et al. (2020). Managing the digital supply chain: The role of smart technologies. *Technovation*, 96–97, 102121. <https://doi.org/10.1016/j.technovation.2020.102121>
- Nava, L. (2022). Rise from ashes: A dynamic framework of organizational learning and resilience in disaster response. *Business and Society Review*, 127(S1), 299–318. <https://doi.org/10.1111/basr.12261>
- Nelson, R. R., & Winter, S. G. (1982). The Schumpeterian Tradeoff revisited. *American Economic Review*, 72, 114.
- Newbert, S. L. (2006). Empirical research on the resource-based view of the firm: An assessment and suggestions for future research. *Strategic Management Journal*, 28(2), 121–146. <https://doi.org/10.1002/smj.573>
- Newbert, S. L. (2008). Value, rareness, competitive advantage, and performance: A conceptual-level empirical investigation of the resource-based view of the firm. *Strategic Management Journal*, 29(7), 745–768. <https://doi.org/10.1002/smj.686>
- Nikpour, A. (2017). The impact of organizational culture on organizational performance: The mediating role of employee's organizational commitment. *International Journal of Organizational Leadership*, 6(1), 65–72. <https://doi.org/10.33844/ijol.2017.60432>
- O'Cass, A., & Sok, P. (2013). The role of intellectual resources, product innovation capability, reputational resources and marketing capability combinations in firm growth. *International Small Business Journal*, 32(8), 996–1018. <https://doi.org/10.1177/0266242613480225>
- Ultra-Badenes, R., & Lozano-Quilis, J. A. (2020). Customer relationship management: Digital transformation and sustainable business model innovation. *Ekonomika Istrazivanja-Economic Research*, 33(1), 2733–2750. <https://doi.org/10.1080/1331677x.2019.1676283>
- Orth, D., & Schuldis, P. M. (2021). Organizational learning and unlearning capabilities for resilience during COVID-19. *The Learning Organization*, 28(6), 509–522. <https://doi.org/10.1108/tlo-07-2020-0130>
- Oura, M. M., Zilber, S. N., & Lopes, E. L. (2016). Innovation capacity, international experience and export performance of SMEs in Brazil. *International Business Review*, 25(4), 921–932. <https://doi.org/10.1016/j.ibusrev.2015.12.002>
- Pesce, D., Neirotti, P., & Paolucci, E. (2019). When culture meets digital platforms: Value creation and stakeholders' alignment in big data use. *Current Issues in Tourism*, 22(15), 1883–1903. <https://doi.org/10.1080/13683500.2019.1591354>
- Peteraf, M. A. (1993). The cornerstones of competitive advantage: A resource-based view. *Strategic Management Journal*, 14(3), 179–191. <https://doi.org/10.1002/smj.4250140303>
- Phongthiya, T., Hirunsothorn, W., Pattanasak, P., Sopadang, A., & Anantana, T. (2024). Impact of contextual factors on new product development process: evidence from a large company in Thailand. *Journal of Innovation and Entrepreneurship*. <https://doi.org/10.1186/s13731-024-00389-1>
- Raj, A., et al. (2022). Supply chain management during and post-COVID-19 pandemic: Mitigation strategies and practical lessons learned. *Journal of Business Research*, 142, 1125–1139. <https://doi.org/10.1016/j.jbusres.2022.01.037>
- Ravindran, T., & Boh, W. F. (2020). Lessons from COVID-19: Toward a pandemic readiness audit checklist for small and medium-sized enterprises. *IEEE Engineering Management Review*, 48(3), 55–62. <https://doi.org/10.1109/emr.2020.3015488>
- Ray, G., Barney, J. B., & Muhanna, W. A. (2003). Capabilities, business processes, and competitive advantage: Choosing the dependent variable in empirical tests of the resource-based view. *Strategic Management Journal*, 25(1), 23–37. <https://doi.org/10.1002/smj.366>

- Razmerita, L., Kirchner, K., & Nabeth, T. (2014). Social media in organizations: Leveraging personal and collective knowledge processes. *Journal of Organizational Computing and Electronic Commerce*, 24(1), 74–93. <https://doi.org/10.1080/10919392.2014.866504>
- Roberts, P., & Amit, R. (2003). The dynamics of innovative activity and competitive advantage: The case of Australian retail banking, 1981 to 1995. *Organization Science*, 14(2), 107–122. <https://doi.org/10.1287/orsc.14.2.107.14990>
- Robertson, J., et al. (2022). Fortune favours the digitally mature: The impact of digital maturity on the organisational resilience of SME retailers during COVID-19. *International Journal of Retail & Distribution Management*, 50(8/9), 1182–1204. <https://doi.org/10.1108/ijrdm-10-2021-0514>
- Rosenbusch, N., Brinckmann, J., & Bausch, A. (2011). Is innovation always beneficial? A meta-analysis of the relationship between innovation and performance in SMEs. *Journal of Business Venturing*, 26(4), 441–457. <https://doi.org/10.1016/j.jbusvent.2009.12.002>
- Rupietta, C., Meuer, J., & Backes-Gellner, U. (2021). How do apprentices moderate the influence of organizational innovation on the technological innovation process? *Empirical Research in Vocational Education and Training*. <https://doi.org/10.1186/s40461-020-00107-7>
- Salavou, H., Baltas, G., & Lioukas, S. (2004). Organisational innovation in SMEs. *European Journal of Marketing*, 38(9/10), 1091–1112. <https://doi.org/10.1108/03090560410548889>
- Schallmo, D. R. A., Williams, C. A., & Lohse, J. (2019). Digital strategy—integrated approach and generic options. *International Journal of Innovation Management*, 23(08), 1940005. <https://doi.org/10.1142/s136391961940005x>
- Setia, P., Venkatesh, V., & Joglekar, S. (2022). Leveraging digital technologies: How information quality leads to localized capabilities and customer service performance. *Social Science Research Network*. <https://doi.org/10.2139/ssrn.4060248>
- Sgobbi, F., & Codara, L. (2022a). *Resilience capability and successful adoption of digital technologies: Two case studies* (pp. 309–327). Springer eBooks. [https://doi.org/10.1007/978-3-030-85954-1\\_18](https://doi.org/10.1007/978-3-030-85954-1_18)
- Shipton, H., et al. (2017). HRM and innovation: Looking across levels. *Human Resource Management Journal*, 27(2), 246–263. <https://doi.org/10.1111/1748-8583.12102>
- Song, M. (2006). Conflict management and innovation performance: An integrated contingency perspective. *Journal of the Academy of Marketing Science*, 34(3), 341–356. <https://doi.org/10.1177/0092070306286705>
- Sriklamah, S., et al. (2020). Do creativity and intellectual capital matter for SMEs sustainability? The role of competitive advantage. *The Journal of Asian Finance, Economics and Business*, 7(12), 397–408. <https://doi.org/10.13106/jafeb.2020.vol7.no12.397>
- Szeto, E. (2000). Innovation capacity: Working towards a mechanism for improving innovation within an inter-organizational network. *The TQM Magazine*, 12(2), 149–158. <https://doi.org/10.1108/09544780010318415>
- Teece, D. J., Peteraf, M. A., & Leih, S. (2016). Dynamic capabilities and organizational agility: Risk, uncertainty, and strategy in the innovation economy. *California Management Review*, 58(4), 13–35. <https://doi.org/10.1525/cm.2016.58.4.13>
- Trindade, D. F. G., et al. (2012). Challenges of knowledge management and creation in communities of practice organisations of deaf and non-deaf members: Requirements for a Web platform. *Behaviour & Information Technology*, 31(8), 799–810. <https://doi.org/10.1080/0144929x.2011.650712>
- Tukamuhabwa, B., et al. (2015). Supply chain resilience: Definition, review and theoretical foundations for further study. *International Journal of Production Research*, 53(18), 5592–5623. <https://doi.org/10.1080/00207543.2015.1037934>
- Ulaş, D. (2019). Digital transformation process and SMEs. *Procedia Computer Science*, 158, 662–671. <https://doi.org/10.1016/j.procs.2019.09.101>
- Vakola, M., & Rezgui, Y. (2000). Organisational learning and innovation in the construction industry. *The Learning Organization*, 7(4), 174–184. <https://doi.org/10.1108/09696470010342324>
- Van Der Merwe, J., & Achkar, Z. A. (2022). Data responsibility, corporate social responsibility, and corporate digital responsibility. *Data & Policy*. <https://doi.org/10.1017/dap.2022.2>
- Van Der Vegt, G. S., et al. (2015). Managing risk and resilience. *Academy of Management Journal*, 58(4), 971–980. <https://doi.org/10.5465/amj.2015.4004>
- Vega-Jurado, J., Gutiérrez-Gracia, A., & Fernández-De-Lucio, I. (2009). Does external knowledge sourcing matter for innovation? Evidence from the Spanish manufacturing industry. *Industrial and Corporate Change*, 18(4), 637–670. <https://doi.org/10.1093/icc/dtp023>
- Verganti, R., & Shani, A. B. (2016). Vision transformation through radical circles. *Organizational Dynamics*, 45(2), 104–113. <https://doi.org/10.1016/j.orgdyn.2016.02.004>
- Verhoef, P. C., et al. (2021). Digital transformation: A multidisciplinary reflection and research agenda. *Journal of Business Research*, 122, 889–901. <https://doi.org/10.1016/j.jbusres.2019.09.022>
- Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *Journal of Strategic Information Systems*, 28(2), 118–144. <https://doi.org/10.1016/j.jsis.2019.01.003>
- Viswanathan, R., & Telukdarie, A. (2021). A systems dynamics approach to SME digitalization. *Procedia Computer Science*, 180, 816–824. <https://doi.org/10.1016/j.procs.2021.01.331>
- Vogelsang, K., et al. (2018). Success factors for fostering a digital transformation in manufacturing companies. *Journal of Enterprise Transformation*, 8(1–2), 121–142. <https://doi.org/10.1080/19488289.2019.1578839>
- Vogus, T. J., & Sutcliffe, K. M. (2007). Organizational resilience: Towards a theory and research agenda. *Man and Cybernetics*. <https://doi.org/10.1109/icsmc.2007.4414160>
- Von Leipzig, T., et al. (2017). Initialising customer-orientated digital transformation in enterprises. *Procedia Manufacturing*, 8, 517–524. <https://doi.org/10.1016/j.promfg.2017.02.066>
- Wahyudiono, N., Hermanto, Y. B., Estiasih, S. P., & Aminatuzzuhro, N. (2024). Performance recovery of creative sector industries: strengthening management literacy and digital business innovation. *Journal of Innovation and Entrepreneurship*. <https://doi.org/10.1186/s13731-024-00376-6>
- Wang, Z., & Wang, N. (2012). Knowledge sharing, innovation and firm performance. *Expert Systems with Applications*, 39(10), 8899–8908. <https://doi.org/10.1016/j.eswa.2012.02.017>
- Weber, Y., & Tarba, S. Y. (2014). Strategic Agility: A state of the art introduction to the special section on Strategic Agility. *California Management Review*, 56(3), 5–12. <https://doi.org/10.1525/cm.2014.56.3.5>

- Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, 5(2), 171–180. <https://doi.org/10.1002/smj.4250050207>
- Wessel, L., et al. (2021). Unpacking the difference between digital transformation and IT-enabled organizational transformation. *Journal of the Association for Information Systems*, 22(1), 102–129. <https://doi.org/10.17705/1jais.00655>
- Wotherspoon, R., Mannion, C., & Harlow, R. E. A. (2020). Maintaining medical team communication using video conferencing during the COVID-19 lockdown. *British Journal of Oral & Maxillofacial Surgery*, 58(10), e326–e327. <https://doi.org/10.1016/j.bjoms.2020.08.114>
- Wu, T., et al. (2021). Enable digital transformation: Entrepreneurial leadership, ambidextrous learning and organisational performance. *Technology Analysis & Strategic Management*, 33(12), 1389–1403. <https://doi.org/10.1080/09537325.2021.1876220>
- Xie, X., et al. (2022). Business networks and organizational resilience capacity in the digital age during COVID-19: A perspective utilizing organizational information processing theory. *Technological Forecasting and Social Change*, 177, 121548. <https://doi.org/10.1016/j.techfore.2022.121548>
- Yoo, Y., Henfridsson, O., & Lyytinen, K. (2010). Research commentary—the new organizing logic of digital innovation: An agenda for information systems research. *Information Systems Research*, 21(4), 724–735. <https://doi.org/10.1287/isre.1100.0322>
- Yu, J. E. (2004). Reconsidering participatory action research for organizational transformation and social change. *Journal of Organisational Transformation & Social Change*, 1(2), 111–141. <https://doi.org/10.1386/jots.1.2.111/0>
- Zahra, S. A. (1993). Environment, corporate entrepreneurship, and financial performance: A taxonomic approach. *Journal of Business Venturing*, 8(4), 319–340. [https://doi.org/10.1016/0883-9026\(93\)90003-n](https://doi.org/10.1016/0883-9026(93)90003-n)
- Zollo, M., & Winter, S. G. (2002). Deliberate learning and the evolution of dynamic capabilities. *Organization Science*, 13(3), 339–351. <https://doi.org/10.1287/orsc.13.3.339.2780>

### Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.