MD
64,13

Received 29 May 2025
Revised 21 August 2025
4 January 2026
Accepted 8 January 2026

Resilience and digital transformation: a small to medium enterprise resilience framework

Gaffar Hafiz Sagala and Dóra Őri
Department of Information Systems, Institute of Data Analytics and Information Systems, Corvinus University of Budapest, Budapest, Hungary

Abstract

Purpose – Globalisation, financial crises, technology disruption and the recent COVID-19 pandemic have escalated competition and market uncertainty that threaten the survival of small and medium-sized enterprises (SMEs). Related to this issue, scholars indicate that digital transformation could help SMEs to generate their resilience. However, the benefits of digital transformation on SMEs' resilience still need to be identified to provide a clear understanding for SMEs' stakeholders and researchers. This study aims to investigate the critical role of digital transformation in gaining SME resilience and identify the antecedents of digital transformation that aim to generate SME resilience.

Design/methodology/approach – To achieve the objectives, we used a systematic literature review (SLR) with thematic analysis and proposed a new conceptual framework for the relationship between digital transformation and SME resilience.

Findings – We found that digital transformation is a critical enabler of SME resilience. Digital transformation enables SMEs to leverage their existing resources and business capabilities to work better and stimulate innovation, which improves business value. In this situation, SMEs can create business agility, which is the ingredient of resilience.

Originality/value – This study contributes to reorganise the literature to identify the theoretical basis regarding the importance of digital transformation in developing SME resilience. This study also suggests critical factors for successful digital transformation including leadership, strategic planning, strategic alignment, collaboration, and learning and digital capability development.

Keywords SME, Resilience, Digital transformation, Business capability, Adaptability, Financial crisis, Dynamic capabilities, Small business, MSME

Paper type Literature review

1. Introduction

Small and medium-sized enterprises (SMEs) make significant contributions to economic inclusion by creating jobs, driving innovation, providing goods and services to underserved markets, and adapting quickly to change (WEF, 2022). SMEs contribute up to 70% of a country's economic growth worldwide and up to 90% of global gross domestic product (GDP) (WEF, 2021). However, globalisation, technological disruption, financial crises, and unpredictable exogenous shocks, such as the COVID-19 pandemic, have led to economic uncertainty and a dynamic business environment that challenge the survival of SMEs (Corvello *et al*., 2023; Sagala and Őri, 2025a; WEF, 2022). Over 50% of SMEs fail within the first five years (OECD, 2016). SMEs also face several internal limitations, including a lack of resources and knowledge, an absence of an innovation culture, insufficient research and development (R&D) capabilities, and a tendency to focus on short-term plans, which complicates efforts to build resilience (Amaral and Peças, 2021; Smith *et al*., 2022; Straková *et al*., 2022; Sagala and Őri, 2025a). Therefore, SMEs require advanced strategies to address

Funding: This study received no funding.

Management Decision
Vol. 64 No. 13, 2026
pp. 126-161
Emerald Publishing Limited
e-ISSN: 1758-6070
p-ISSN: 0025-1747
DOI 10.1108/MD-05-2025-1470

both internal and external challenges to achieve business resilience. Investigating how SMEs develop resilience is important to maintain their contribution to the global economy (Chit *et al*., 2023; Ciasullo *et al*., 2022; Kamalahmadi and Parast, 2016).

SME resilience refers to the ability of SMEs to absorb shocks, return to their pre-disturbance state, and learn from experience to anticipate future shocks through flexible and innovative solutions (Bhamra *et al*., 2011; Kamalahmadi and Parast, 2016; Yao and Fabbe-Costes, 2018). Research into strategies for generating SME resilience has increased, particularly during and after the COVID-19 pandemic, resulting in positive growth in knowledge in this field. Koporcic *et al.* (2025) have proposed a comprehensive model for developing resilience in the context of SMEs. Koporcic *et al.* (2025) argue that SMEs face challenges from both internal and external factors and highlight the individual and organisational levels that SMEs should consider to manage internal factors and promote collaboration in addressing external factors. Similarly, Leonelli *et al*. (2025) suggest that the individual resilience of entrepreneurs is crucial for initiating resilience at the organisational level and subsequently activating the resilient response of SMEs. The entrepreneur in SME businesses is the central figure in translating a resilience strategy into a set of organisational attributes at the organisational level, enabling SMEs to respond to economic challenges (Leonelli *et al*., 2025; Lengnick-Hall *et al*., 2011; Su and Junge, 2023). Researchers also highlighted the uniqueness of SMEs compared to larger companies, as SMEs have a simpler structure, informal business processes, and centralised decision-making by their owner-manager (Branicki *et al*., 2018; He *et al*., 2019; Sagala and Őri, 2025a). Consequently, the strategy for SMEs to achieve resilience may differ from that of larger companies, especially in how they overcome their limitations in responding to disturbances.

Satpathy *et al*. (2025) have examined strategies to enhance the adaptability of SMEs in the post-COVID-19 era through a literature review. Satpathy *et al*. (2025) highlight the importance of adopting digital technology and fostering collaboration with larger organisations to improve the long-term adaptability and sustainability of SMEs. The researchers advocate collaboration as a means to address SMEs' resource limitations by leveraging the resources of partner companies through partnership mechanisms (Satpathy *et al*., 2025; Koporcic *et al*., 2025; Sagala and Őri, 2025a). Similarly, digital transformation is promoted as an effective strategy to increase the business agility of SMEs, enabling them to identify opportunities, reconfigure business models, and develop new services (Satpathy *et al*., 2025; Wang and Sun, 2025a). Digital transformation involves integrating digital devices into existing business practices, transforming processes to increase business value and achieve new competitive advantages (Ashiru *et al*., 2023; Khurana *et al*., 2022). During the COVID-19 crisis, digital technology enabled SMEs to continue operations under physical distancing regulations through remote business management, online commerce and transactions, and digital marketing, demonstrating the success of digitalisation in supporting SMEs' resilience (Khurana *et al*., 2022; Morris *et al*., 2022). However, these studies have not yet detailed how digital transformation can improve SMEs' resilience capability, nor specifically examined the digital transformation strategy pathway for SMEs to achieve business resilience. Especially in times of crisis, SMEs often face significant challenges in initiating digital transformation because of limited resources and the adverse effects of various disruptions. The unclear digital transformation pathway has created ambiguity among SMEs, which may result in mismanagement of their digital strategy and ultimately risk digital misinvestment or vulnerability, rather than achieving business resilience (Kumar *et al*., 2024a; Razavi Hajiagha *et al*., 2024; Sagala and Őri, 2025a).

At the same time, the role of digital transformation in relation to business capability remains an inconsistent concept. Researchers have identified multiple roles for digital transformation in the pursuit of business success, such as a direct antecedent of SMEs' competitive advantage (Cugno *et al*., 2022; Xu *et al*., 2024), a mediator between SMEs' internal capabilities and resilience (Aghazadeh *et al*., 2024; Velu *et al*., 2019), and a moderator that enhances the effect of SMEs' existing resources and improves business capabilities that enable resilience (Awad and Martin-Rojas, 2024; Sinha *et al*., 2024). Moreover, Marrucci *et al*. (2025) highlighted that

organisational agility, flexibility, and environmental dynamism are key drivers of high digital technology adoption among SMEs. In the mainstream of SMEs' resilience research, digital technology adoption is expected to improve business agility and adaptability, which are critical for resilience (Wang and Sun, 2025a). Additionally, Marchese *et al*. (2025) suggest that the adaptive capabilities of an organisation lead to a more creative approach to handling a turbulent environment, while digital technology plays a pivotal role in enhancing the company's dynamic capabilities in such conditions. Therefore, further investigation and knowledge development are still required to clarify the role of digital technology in resilience within the specific context of SMEs and to connect it with practical knowledge and strategies that can be applied easily and effectively (Klein and Todesco, 2021).

This study aims to clarify how digital transformation contributes to enhancing the resilience of SMEs, identify digital transformation strategies relevant to developing SME resilience, and construct a structured framework outlining the path of digital transformation and resilience strategy in the SME context, based on published literature in the business and management fields. The key research questions addressed are: (1) What is the role of digital transformation in enhancing SME resilience? (2) What are the antecedents of digital transformation that relate to SME resilience?

This study combines the perspectives of business capabilities (Derguech *et al*., 2017; El Sawy and Pavlou, 2008), sustainable strategies (Damiano and Valenza, 2025), and the transformation stage of dynamic capabilities (Teece *et al*., 2016; Wang and Sun, 2025a) as the basis for the structured framework of digital transformation and resilience in SMEs. Business capability refers to the functional attributes of a company that enable it to adopt configurable business models to address specific requirements and fulfil organisational needs (Sheffi and Rice, 2005; El Sawy and Pavlou, 2008; Derguech *et al*., 2017). El Sawy and Pavlou (2008) argue that technology adoption improves existing operational capabilities, transforming them into dynamic and improvisational capabilities, which implies readiness to face market volatility. Furthermore, we adopt the sustainable strategy proposed by Damiano and Valenza (2025) as the strategic path for business resilience. This path includes "entrepreneurial orientation and attitude", "capabilities and lean thinking", and "means and process" (Damiano and Valenza, 2025). However, we focus on the digital transformation path that addresses the business resilience of SMEs. Obiri-Yeboah *et al*. (2025) advocate a practice-based perspective that emphasises the orientation of transformation to address practical business problems, such as navigating digital literacy to enhance supply chain resilience. Obiri-Yeboah *et al*. (2025) highlight that practical digital tools should receive more attention for management purposes rather than extensive leadership programmes. This view aligns with the transformation stage of dynamic capabilities (Teece, 2007; Teece *et al*., 2016). The transformation stage requires entrepreneurs to reconfigure their businesses to improve capabilities in response to shifting market expectations (Teece *et al*., 2016).

This study conducts a systematic literature review (SLR) to gather theoretical concepts and empirical evidence from published literature. We also employ thematic analysis to identify relevant themes and reorganise the framework of SME resilience (Lucas *et al*., 2007; Berbekova *et al*., 2021; Ward *et al*., 2009). The proposed framework will contribute to a clearer understanding of how to drive digital transformation and address the resilience of SMEs. It will also provide a proportional understanding of the digital transformation pathway to generate resilience, enabling scholars, SME actors, and policymakers to form informed views on exploiting digital technology. The following sections of this article will include the theoretical background, research methodology, findings and discussion, future research directions, and concluding remarks.

2. Theoretical background

2.1 Resilience in SMEs

SME resilience refers to the ability of SMEs to return to their pre-disturbance state after disruption and to learn from experience in order to anticipate future disruptions through

flexible and innovative solutions (Bhamra *et al*., 2011; Kamalahmadi and Parast, 2016; Yao and Fabbe-Costes, 2018). Disruptions may include crises, natural disasters, economic downturns, market volatility, and technological shifts in the current business environment (Carayannis *et al.*, 2024). From the organisational resilience perspective, Meyer (1982) argues that organisations should demonstrate adaptability and foster innovation to absorb the impact of disturbances. Meyer (1982) proposes single-loop learning to create adaptability and double-loop learning to foster innovation. Consistently, later research has also highlighted the importance of adaptability and innovation in generating business resilience. Kamalahmadi and Parast (2016), Jia *et al*. (2020), and Mousa *et al*. (2020) indicate that the ability to bounce back after a crisis is related to the dynamic and adaptive capacity to respond to unexpected disruption by changing the business to recover and sustain operations despite threats. From this perspective, business entities need to be adaptive, flexible, and agile in changing their business models in response to market changes to overcome crises and generate resilience (Duchek, 2020; Al Omoush *et al*., 2025; Sagala and Őri, 2025b).

In the SME context, SMEs are characterised by informal and flexible business processes, simple structures and bureaucracy, and rapid decision-making, which enable them to learn quickly and adapt their business models with flexibility (Storey, 2016; Sullivan-Taylor and Branicki, 2011; Al Omoush *et al*., 2025). Branicki *et al*. (2018) also found that SMEs typically engage in informal planning and manage resilience as a reactive strategy, responding to disturbances as they occur and then adapting their businesses accordingly. These studies indicate that SMEs possess relative advantages embedded in their characteristics and may require different approaches to building resilience compared to large companies. However, most SMEs also face resource scarcity, limited access to finance, and restricted cognitive responses, which are major challenges when confronting external threats (Storey, 2016; Al Omoush *et al*., 2025; Sagala and Őri, 2025b). Therefore, the critical point is that SMEs must enhance their business capabilities to accurately sense threats and promote change in order to achieve resilience (Sheffi and Rice, 2005). Business capability is the primary area that SMEs should develop to address relevant organisational problems and continuously update their business models to remain relevant in their specific business environments.

Business capability refers to the functional attributes of a company that enable it to adopt configurable business models to address specific requirements and fulfil organisational needs (Derguech *et al*., 2017). Furthermore, El Sawy and Pavlou (2008) assert that businesses must cultivate more sophisticated capabilities to confront uncertainty, including dynamic and improvisational capabilities. Dynamic and improvisational capabilities enable a company to reconfigure ineffective business processes that no longer fit the new business environment due to turbulence, creating new strategic advantages that are more appropriate (El Sawy and Pavlou, 2008). Teece (2007) and Teece *et al*. (2016) indicate that dynamic capabilities are critical in enabling a company to create a competitive advantage in a rapidly changing business environment, generating agility and sustaining the business.

Regarding the strategic path in developing business capability, we adopt the sustainability strategy proposed by Damiano and Valenza (2025) and the transformation phase of the dynamic capabilities framework (Teece *et al*., 2016). Damiano and Valenza (2025) promote a sustainability strategy for SMEs to develop sustainable and resilient businesses through input, throughput, and output processes. The input process requires an appropriate response from the entrepreneur to external threats and opportunities (Damiano and Valenza, 2025). Furthermore, the throughput process requires an entrepreneurial orientation and attitude in developing relevant capabilities and lean thinking and then defining these as a strategy and business process (Damiano and Valenza, 2025). Damiano and Valenza (2025) emphasise that entrepreneurs should be able to transfer specific capabilities to their business strategies and processes. As an outcome, the new business strategy and process are expected to benefit sustainable business environments and the overall economy (Damiano and Valenza, 2025). According to the dynamic capabilities framework, the process of changing and improving business capabilities is part of the transformation phase (Teece *et al*., 1997; Teece, 2007;

Teece *et al*., 2016). Therefore, we adopt the dynamic capabilities framework to define the process of transforming or reconfiguring a business model in response to changes in market expectations due to disruptions and to achieve resilience. In line with the throughput process, the transformation phase promotes reconfiguring SMEs' resources and business models to improve their business capabilities in facing disturbances during crises and enabling SMEs' resilience (Teece *et al*., 2016).

2.2 Digital transformation in contributing to resilience in SMEs

Digital transformation in SMEs is defined as the integration of digital devices into existing business practices to increase business value by creating new competitive advantages (Ben Slimane *et al*., 2022; Ghobakhloo and Tang, 2015; Őri *et al*., 2024). Digital technology encompasses information, communication, computing, and connectivity technologies that transform business strategy processes by providing practical solutions for SMEs in various contexts, such as digital marketing, digital payments, financial technology, e-commerce, enterprise resource planning (ERP), digital customer relationship management (CRM), and virtual workspaces (Ashiru *et al*., 2023; Carayannis *et al*., 2024; Khurana *et al*., 2022; Verhoef *et al*., 2021; Dluhopolskyi *et al*., 2023; Nan and Park, 2022).

Khurana *et al*. (2022) highlighted the importance of technological adoption in enhancing dynamic capabilities and SMEs' resilience. Khurana *et al*. (2022) argue that digital technology enables SMEs to generate positive spillovers by making business operations less rigid and more flexible. This flexibility creates opportunities for implementing a dynamic working environment, initiating collaboration, and enabling companies to pursue venture creation (Khurana *et al*., 2022; Őri *et al*., 2024). Such positive spillovers allow SMEs to build situational awareness, manage vulnerabilities, exploit existing potential, and develop adaptive capacity and competitive advantage (Robertson *et al*., 2022; Rader, 2019). In this context, the availability of digital technology enables organisations to become aware of disruptions more quickly, identify various alternative strategies for dealing with crises, find collaboration partners to help overcome business difficulties during crises, and implement strategies to cope with the crisis.

However, SMEs require an effective strategy to govern their digital transformation initiatives and manage the risks associated with digital investments, particularly in enhancing business resilience (Klein and Todesco, 2021; Pelletier and Cloutier, 2019). Kumar *et al*. (2024b) and Razavi Hajiagha *et al*. (2024) suggest that SMEs need to define a digital resilience strategy to create pathways based on their available resources. In this context, we adopt the transformation phase of the dynamic capability framework (Teece *et al*., 1997; Teece, 2007; Teece *et al*., 2016) to understand how SMEs address digital transformation and develop pathways to generate resilience. Transformation in dynamic capabilities enables SMEs to respond to changes in a high-velocity market by leveraging resources saved during stable periods to innovate during a crisis (Teece *et al*., 2016; Leppäaho and Ritala, 2022; Vasi *et al*., 2024). We argue that the transformation process is relevant for describing the path of SMEs' digital transformation to achieve business resilience.

This study examines the interaction between digital transformation and the resilience of SMEs, and proposes a strategy for SME stakeholders. We present a theoretical overview based on previous research. Resilience is defined as the ability of SMEs to address challenges in today's dynamic business environment resulting from crises, economic disturbance, intense competition, globalisation, or natural disasters. This study focuses on the transformation phase to address the lack of evidence on how SMEs approach and manage the digital transformation process to achieve business resilience. It contributes an integrative framework identifying the enablers of digital transformation for enhancing business capabilities as a pathway to SME resilience. This study also proposes the conception of adaptability and agility as a continuum for achieving resilience.

3. Research method

We used a SLR as it enables researchers to develop evidence-based reviews that minimise bias through comprehensive literature searches of relevant articles using systematic procedures (Okoli, 2015; Tranfield *et al*., 2003). Although initially developed in the health field, SLR has been widely applied in information systems over the past 2 decades (Okoli, 2015). This study was designed to address the original objective of an SLR. It focuses the literature review on developing holistic theoretical concepts and coherent theoretical narratives by summarising evidence, identifying gaps in primary articles, and providing a framework for positioning research endeavours (Fink, 2019; Okoli, 2015; Webster and Watson, 2002). The present study used the SLR to identify how SMEs utilise digital transformation to pursue resilience. It also identified the digital transformation strategies suitable for SMEs that effectively generate business capabilities contributing to resilience. To achieve these aims, we used thematic analysis to define the themes of the main results of each publication, generate a knowledge map, and propose a framework for SMEs' resilience (Lucas *et al*., 2007; Patel *et al*., 2017). We used thematic analysis because it enables researchers to obtain data or evidence from multiple studies, that is useful for identifying and listing various critical or influential factors proposed in selected articles. This approach is essential for developing a comprehensive framework on SMEs' resilience (see Lucas *et al*., 2007; Patel *et al*., 2017).

3.1 Article selection protocol

We adopted the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) approach to collect the relevant published articles from the Scopus and Web of Science (WoS) databases (Moher *et al*., 2009; Page *et al*., 2021). Even though the PRISMA approach was originally developed for clinical and health science, it is widely adopted in business and management fields for systematically selecting the literature for systematic review (Ed-Dafali *et al*., 2025; Ibikunle *et al*., 2025; Sahoo *et al*., 2024). The PRISMA approach helps researchers create a transparent, complete, and accurate account of how the literature was identified and selected, how the selected literature were reviewed and analysed, and how the review findings were synthesised (Page *et al*., 2021). That transparent and accurate protocol would result in rigorous analysis and prevent bias in the systematic review findings (Liberati *et al*., 2009). Based on Moher *et al*. (2009) and Page *et al*. (2021), we distribute the selection protocol into Identification, Screening, and Eligibility to select the included articles for review. We also applied inclusion and exclusion criteria in the eligibility stage to ensure the selected article was suitable for achieving the research objective (Page *et al*., 2021). The protocols were iteratively reviewed between researchers to assess the risk of bias in the article selection protocol and refined accordingly (Page *et al*., 2021; Caputo *et al*., 2021). Furthermore, the selection result was also consulted iteratively to prevent bias in the article inclusion and exclusion process. The systematic selection protocol is presented in Figure 1 and listed as follows:

(1) Identification

The primary article was collected from Scopus and WoS databases. It is because of their credibility in providing a reputable publication channel, which is widely recognized nowadays (Caputo *et al*., 2021). Scopus and WoS databases list reputable publishers and academic journals that are expected to provide an appropriate understanding of the observed phenomenon. We applied the following search string: "*sme**" *OR* "*small-medium enterprise**", "*resilien**", and *"digital" OR "digitalization OR "digitalisation" OR "digital transformation" OR "digitization"* in the title, abstract, or keywords in both databases. We applied multiple styles of words or terminology to improve the probability of collecting articles and prevent uncollected articles due to different terminology styles. Additionally, we limited the search to journal and English-language articles with the time frame between 2017 and 2024. We limited the time frame

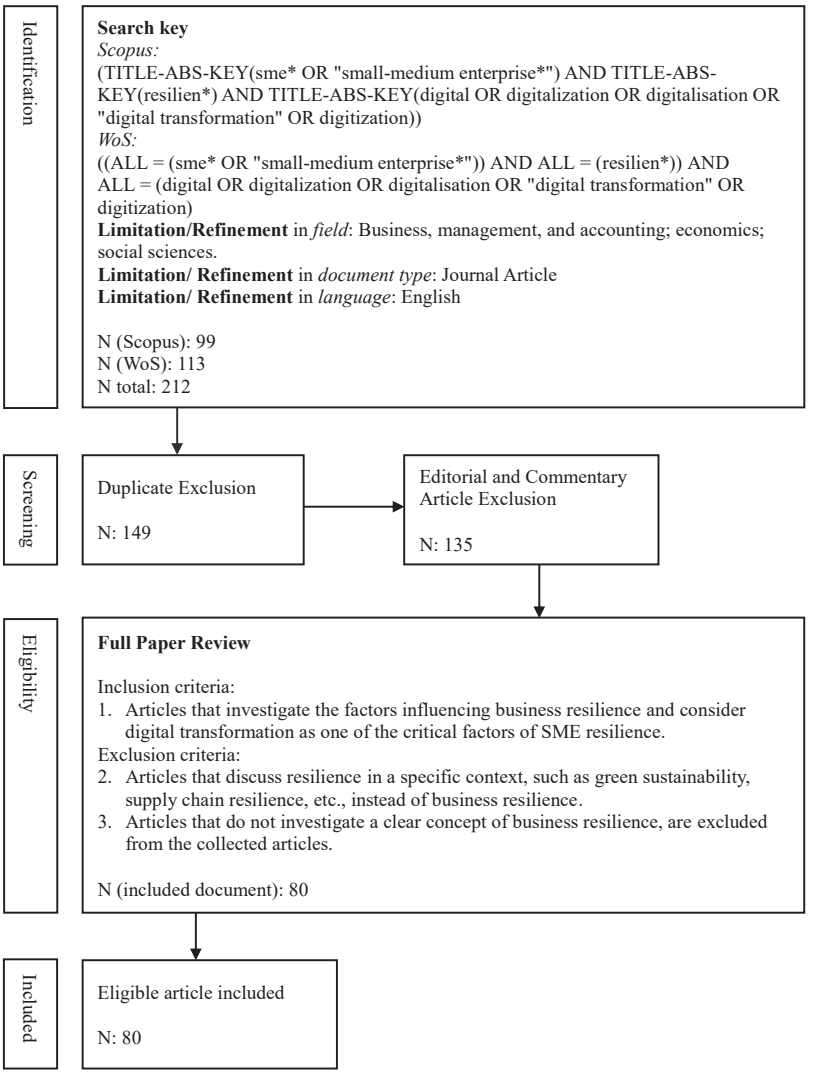

Figure 1. PRISMA Article Selection Protocol. Source: Authors' own work

because, according to the Scopus database, the number of research publications regarding SMEs' resilience significantly increased during the COVID-19 crisis (2020–2022). Thus, it was relevant to collect related articles from around that timeframe. Furthermore, we also limited the field area to business, management, accounting, economics, and social science research fields to ensure that the collected articles were discussing SMEs' resilience and digital transformation from the business and management perspective. Furthermore, we limited the literature sources to journal articles because journal articles are more complete research reports and influential research than proceeding papers (Gonzalez-Albo and Bordons, 2011). However, we did not apply a quality threshold for the publication channel because we assumed that the published articles in the Scopus and WoS databases had passed the double-anonymized review process, so they fulfilled the academic qualification. The article identification strategy resulted in 99 articles from the Scopus database and 113 from the WoS database.

(2) Screening

We screened the collected articles to remove duplicates. We also screened the collected documents through abstract reading to exclude editorial and commentary articles. We exclude them as they did not utilize empirical or conceptual research results to discuss the SMEs' resilience and digital transformation concepts. We identified 44 duplicated documents, and after removing these duplicates, 168 articles were left. Furthermore, 154 articles were left in the screening stage after excluding the editorial and commentary articles.

(3) Eligibility

In eligibility stage, we applied inclusion and exclusion criteria to select the eligible articles related to the research objectives (Page *et al*., 2021). The inclusion criteria focused on the primary articles that investigate the factors influencing business resilience and consider digital transformation as one of the critical factors of SME resilience. We designed the inclusion criteria to manage the collected articles to align with the research objective, which is to investigate the critical point of digital transformation to gain SME resilience. Furthermore, the exclusion criteria were designed to control the focus of observed concepts in the selected articles. This study aims to observe resilience in the context of business continuity or sustainability in times of disturbances or crisis instead of supply chain resilience, IT resilience, construction resilience, and environmental sustainability. Therefore, articles that discuss resilience in a specific context, such as green sustainability, supply chain resilience, etc., instead of business resilience and do not discuss a clear concept of business resilience were excluded from the collected articles. All articles not meeting the criteria are excluded from the collected article. After the eligibility stage, we selected 80 articles that met the requirements and included them in the review stage.

3.2 Coding and analysis technique

This study uses a qualitative approach to the primary articles to identify the type of contribution of digital transformation in generating SME resilience and then categorises them into themes. We identify this issue to determine what kind of relationship exists between digital transformation and SMEs' resilience. It is critical to understand that issue to construct a suitable digital transformation strategy to help SMEs generate resilience. We performed thematic analysis to identify the theoretical and empirical evidence and reconstructed it into a conceptual framework. This analysis approach was inspired by Berbekova *et al.* (2021). According to Bansal *et al*. (2022), Braun and Clarke (2006), and Walters (2016), thematic analysis enables researchers to construct new theoretical directions based on academic literature, interviews, focus groups, and social media sources. In this study, we use academic literature as an information source to identify empirical evidence of related phenomena and reported knowledge patterns and to construct a new theoretical model.

The use of thematic analysis in literature reviews is common. However, the implementation varies among researchers. Several researchers classified the collected articles based on the theme into groups of articles (see: Ali, 2021; Liñán and Fayolle, 2015; Rashid *et al*., 2019). Besides, several researchers also used the abstract and full paper as information sources that openly coded and identified the theme based on delivered information without grouping the primary articles (Berbekova *et al*., 2021; Mallinson *et al*., 2020). The current study performed the second alternative. This study collected and tabulated information from the primary study without grouping them and further developed categories for our coding scheme based on the findings (Mallinson *et al*., 2020). This technique was applied to help researchers handle the complex results of the primary articles and synthesise themes from the findings of the primary articles (Page *et al*., 2021). We adapted the thematic analysis procedure from Berbekova *et al.* (2021), which was applied to the SLR. The coding and analysis procedure is outlined as follows.

(1) *Data familiarisation.* We familiarised ourselves with the data, did an initial inspection, and generated a review tabulation containing the title, objective, research methods and analysis technique, findings, and suggestions for each primary article.

(2) *Open coding and tabulation.* We applied data-driven thematic analysis with an inductive approach (Berbekova *et al*., 2021). The inductive approach implies that the coding and identification of themes are not driven by any specific theoretical perspective nor preexisting coding frame (Berbekova *et al*., 2021). Thus, we coded the information from the findings of the primary articles and categorised and grouped them based on the shared contexts of discussion. Each article could have included several groups depending on the variability of information discussed in the article. The primary article may have presented findings that cover multiple variables that are not enough to be represented by a single theme. Therefore, the findings could be distributed into several themes that are relevant to those findings for more precise analysis.

(3) *Theme identification.* We identified and refined the themes across the findings of primary articles. We highlighted the keywords and added the theme based on the keywords of each piece of information collected. In this stage, we also implemented an iterative review process to prevent researchers' bias in interpreting the information and performed the thematic refinement. The identified themes were named at the end, and the keywords were presented in tables.

4. Findings

4.1 Demography of primary articles

After applying the article selection protocol, we collected 80 primary articles. In the text, we use in-text citations for the primary articles, while in the appendices we use codes A1, A2, and so on to make the primary articles easier to identify. The list of primary articles is provided in Appendix 1. The demographics of the collected articles are summarised in Appendix 2, while the comprehensive review tabulation is presented in Appendix 3. According to Appendix 2, of the eighty primary articles, twenty-seven were published in the Scopus database, eight in the WoS database, and forty-five in both the Scopus and WoS databases. Furthermore, according to the review tabulation data in Appendix 3, published research on digital transformation and SME resilience has already been conducted using various research methods. However, there is still potential to be explored and examined empirically to construct a holistic and in-depth understanding of resilience in the business field.

4.2 Thematic findings

The first step we applied to the primary articles was to identify their key findings. We then classified the primary articles based on the similarity of these key findings according to the topics discussed. This classification resulted in three themes: (1) digital transformation as a critical antecedent of resilience, (2) digital transformation as a lever for resilience, and (3) digital transformation as influenced by multiple factors. After classifying and grouping the primary articles, we identified the critical points of digital transformation and the capabilities required to achieve resilience. The identified factors and critical points of digital transformation are used as evidence to strengthen the theoretical and empirical justification of the SME resilience framework proposed in this article. The review tabulation is summarised in Tables 1-3.

4.2.1 Theme 1: Digital transformation as a critical antecedent of resilience. The primary articles consistently argue that digital transformation is essential for generating resilience in SMEs. They emphasise that it is a key source of resilience (Eriksson *et al*., 2022; Holl and

Table 1. Digital transformation as a critical antecedent of resilience

No.	Themes	Findings (from primary studies)	Keywords
	Digital transformation as a critical antecedent of resilience	• The success of IT projects of DT is an essential for *enhancing* the performance and *resilience* of SMEs (Kala Kamdjoug, 2024) • Digitalisation is *one of the critical sources factors of resilience* (Eriksson *et al*., 2022) • AI forecasts digital innovation through adaptive resilience; family-owned SMEs intend to adopt AI, but SMEs face challenges using IoT edge (Saleem *et al*., 2023) • Level of investment in adopting innovations, digitalisation, and sustainability *affects a company's growth*; The "training" factor is more relevant than human capital expressed by academic training (Avelar *et al*., 2024) • *Low digitalisation* is the weaknesses of SMEs that become the *main obstacles to resilience* in this crisis (Iancu *et al*., 2022) • International knowledge, personal drivers and *digital transformation are determined to be the most important cause factors* (Razavi Hajiagha *et al*., 2024) • *Digital business transformation significantly impacts* frugal innovation and *SMEs' resilience* in emerging markets; Organisational learning significantly impacts digital business transformation, frugal innovation and SMEs' resilience (Al Omoush *et al*., 2025) • Entrepreneurial ventures that *adopted digital technologies* and had access to loans *increased* their performance and *survival during the COVID-19 pandemic*, those *who failed* in these aspects *experienced negative performance and survival effects* (Gambirage *et al*., 2023) • *The implementation of digital tools* and networking opportunities *improved the perceived economic performance* of the enterprise during crises (Apostolopoulos *et al*., 2024) • The *adoption of digital technologies favours* the competitiveness, *resilience*, and internationalisation of firms (Holl and Rama, 2024) • The *unfavourable circumstance* (like: catastrophic sales decline) can be *effectively resolved when SMEs incorporate mobile money* into their daily business (Nan and Park, 2022) • *Pandemic-driven digital transformation* of retailing *has lasting effects* on offline SMEs (Xu *et al*., 2024) • Digital selling platforms *positively affect* exports, whereas public procurement negatively affects F&B SMEs exports (Ballerini *et al*., 2023) • Openness to *Industry 4.0* has a positive and significant *direct effect* on a *perceived production recovery* in the short term (within 2021) and medium term (within 2022 and 2023) (Cugno *et al*., 2022) • The weaknesses of SME (such as their limited liquidity, human resources, digitalisation, and use of information technology) are the *principal obstacle to a resilient* response to this crisis (Rodrigues *et al*., 2021)	• Critical sources factors, essential, determined, lasting effect, principal obstacle (negative term), failed – negative performance

Source(s): Authors' own work

Table 2. Digital transformation as a lever for resilience

No.	Themes	Findings (from primary studies)	Keywords
	Digital transformation as a lever for resilience	*Digital Transformation Leveraging SMEs' Business Capability* • CSR, Digital Transformations and entrepreneurship synergy empower SMEs to forge resilient business environments through *enabling* enterprises to thrive amidst challenges and stay competitive (Awad and Martín-Rojas, 2024) • E-commerce firms experiencing a *less* pronounced immediate drop and a *quicker* rebound (digital inclusion: e-commerce, remote work, and adopting electronic information systems) (Cong *et al*., 2024) • Ability to successfully *leverage* on these communal resources (digital platform) and local public goods (Avlijaš, 2022) • SMEs that are utilising digital platforms *through technology, digital marketing, and innovations* gained success and profitability in passing the crisis (Hossain *et al*., 2022) • Capacity of digital financial inclusion is needed to *address funding difficulties* faced by SMEs, *encounters limitations* pertaining to technical assistance and discrepancies in information (Jin and Liu, 2025) • The use of at least basic digital technologies and selling only it can be a way to *stimulate the growth of added value* and the employment of SMEs (Roman and Rusu, 2022) • Digital technologies help SMEs in developing countries become *more resilient* in facing crises and securing their future (the *ability to work from home*) (Khalil *et al*., 2022) • Digital technologies help to internationalise SMEs, the relationship is *mediated by the presence of an already consolidated Intellectual Capital* (Wang *et al*., 2024) • Digital imperatives could hasten resilience and growth to attain sustainability (Bachtiar *et al*., 2023) • Adopting digital technologies, modifying business models, and process innovation would *enhance internal operation*, product innovation, achieving competitiveness and improved performance (Akpan *et al*., 2024) • The adoption of IR 4.0 technologies *equips SMEs with the digital capabilities* necessary for resilience in future crisis (Senin *et al*., 2024) • Made a significant effort to apply and exploit the opportunities offered by digital platforms and tools, and through the process they also become *more professionalised* as entrepreneurs, and their entrepreneurial confidence grew (Gergely *et al*., 2024) • By allowing SMEs to transform themselves through embracing digital technologies to the emergence of resilience capability as a *second-order dynamic capability* (Khurana *et al*., 2022) • Knowledge intensive processes *in digital platforms* play an important role in crisis management and efficiently increase resilience (Guo *et al*., 2023) • Digital technologies integration with relevant standardisation of data science platforms could *help SMEs implement effective collaboration* with partner organisations (Han and Trimi, 2022) • Digital depth *moderates* the relationship between digital scope and resilience (Sinha *et al*., 2024) • The increased use of technologies (*sports services digitisation*) during the pandemic have been essential to maintaining the performance of the sports business (González-Serrano *et al*., 2023a) • The disability to take advantage of digital devices reduced businesses' opportunities to *pursue diversified activities* and limited the ability to develop resilience in economically challenging times (Morris *et al*., 2022) • IT investment, exploitation of new IT trends and markets, and innovating new mobility will *facilitate managerial acumens*; Managerial and operational acumens contribute the most to a firm's performance (sales and productivity) (Audretsch and Belitski, 2021) • Digitalisation is crucial in *compensating for the restrictions* to maintain employment in knowledge-intensive SMEs (Hrivnák *et al*., 2021) • Higher degree in the use of information systems and dealing with cybersecurity issues deliver *better competitiveness* (Westerlund, 2020) • The Information System Artifact has *mediated the effect of a positive set of behavioural capital* on organisational resilience (Velu *et al*., 2019)	• Leverage, enhance, empower, enabling, stimulate, facilitate, equip, improve, help, moderate • Enhance adaptability, improving adaptability, improving ability to adapt, enhancing adaptive capacity • Enhance business agility, foster organisational agility, increase organisational responsiveness, propose new value to the new requirements and trends

(*continued*)

Table 2. Continued

No.	Themes	Findings (from primary studies)	Keywords
		Digital Transformation Enabling SMEs Adaptability • Substantial investments in technology and digital infrastructure are critical to *enhance* economic resilience and *adaptability* (Hasayotin *et al*., 2024) • Digital technologies facilitate organisational learning and innovation, thereby augmenting the resilience of SMEs; Digital technologies enhance SMEs' learning capacity and stimulate innovation, ultimately *improving their adaptability* to market fluctuations and capitalise on emerging opportunities (Awad and Martín-Rojas, 2024) • Gen AI offers transformative potential for SMEs by automating processes, enhancing decision-making and fostering innovation, thereby *improving their ability to adapt* and thrive amidst market uncertainties (Carayannis *et al*., 2024) • Digitally mature SMEs exhibited higher levels of organisational resilience, specifically in *situational awareness*, management of keystone vulnerabilities, and *adaptive capacity* (Robertson *et al*., 2022) • Digital Depth and Digital Scope of digitalisation exhibit curvilinear associations with resilience, suggesting optimal levels for maximum benefits; Digital depth *moderates* the relationship between digital scope and resilience, highlighting their interactive role in *enhancing adaptive capacities* (Sinha *et al*., 2024) *Digital Transformation Enabling SMEs Agility* • Business resilience can be enhanced *through business agility*, whereas business agility can be improved through networking capabilities, an entrepreneurial orientation, and business model innovation (Waty *et al*., 2023) • Adopting digital transformation leadership *fosters organisational agility*, enabling effective digital transformation and business model innovation with a robust knowledge transfer system (Ramadan *et al*., 2023) • IT competencies and organisational ambidexterity strengthen organisational resilience, reduce missed opportunities and *increase organisations' responsiveness* to market volatility and enhance the business performance of SMEs (Trieu *et al*., 2023) • The wider use of digital marketing instruments helps SMEs to *propose a new value for customers aligned to the new requirements and trends* in tourism, such as travel security, prevailing interest in individual and short-term trips for short distances, and the sharply increased demand for domestic tourism destinations (Sheresheva *et al*., 2021)	

Source(s): Authors' own work

Rama, 2024; Kala Kamdjoug, 2024; Razavi Hajiagha *et al*., 2024). Cugno *et al*. (2022) highlight that digital transformation positively affects the production recovery of manufacturing SMEs, leading to greater company resilience. Similarly, Xu *et al*. (2024) found that offline retail SMEs that implement digital transformation experience lasting improvements in their resilience. Nan and Park (2022) found that digital financial services can help SMEs overcome adverse situations such as declining sales during crises. This underscores the long-term benefits of digital transformation. From another perspective, Iancu *et al*. (2022) found that low levels of digitalisation can be a significant obstacle for SMEs in building resilience during a crisis. Avelar *et al*. (2024) also found that the level of investment in adopting innovations and digitalisation positively influences a company's growth. In this context, entrepreneurial ventures that adopted digital technologies were able to maintain their performance and support their survival during times of crisis. Conversely, SMEs that failed in these areas experienced negative effects on performance and survival (Gambirage *et al*., 2023). From the primary articles, we found significant evidence that digital transformation makes a critical contribution to SMEs' resilience in times of crisis. However, how digital transformation generates SME resilience remains unclear. The key aspect of the relationship between digital transformation and SME resilience needs to be more clearly defined to provide a solid understanding of how digital transformation can help SMEs develop the ability to adapt, change, and generate alternative strategies during crises. Therefore, the following themes explore the nature of the relationship between digital transformation and SME resilience.

Table 3. Digital Transformation is Influenced by Multiple Factors

No.	Themes	Findings (from primary studies)	Keywords
	Digital transformation is influenced by multiple factors	*Digital transformation is influenced by multiple factors* • The *single digital innovation dimension is not necessary* for organisational resilience, and the *multi-dimensional digital innovation synergy effectively enhances organisational resilience* (Wang and Sun, 2025a) • Organisational resilience improvement hinges *not on a singular digital innovation but on the interactions among various digital innovations* (Wang and Sun, 2025b) • *Critical values SMEs need* to achieve successful digital transformation, including dynamic capabilities, digital capability, digital inclusion, leadership orientation, learning and knowledge management, and collaboration (Sagala and Őri, 2025b) • Digital transformation *alone may not foster* organisational resilience (Soomro and Khan, 2024) *Leadership* • The entrepreneurs who adopted online store technology exhibited differential identity motives and a resilience mindset; to modify entrepreneurs' resilience enactment *entrepreneurs* may need to *modify their identity motives (to externally focus) or act consciously to override them* (Smith *et al*., 2022) • Adopting *digital transformation leadership* fosters organisational agility, *enabling effective digital transformation* and business model innovation with a robust knowledge transfer system (Ramadan *et al*., 2023) • *Management competencies, knowledge management, and monitoring and controlling* were the most crucial to enhance digital resilience among SMEs (Kumar *et al*., 2024a) • *Managers have to pay attention to the development of noncognitive dynamic capabilities* to ensure the success of digital transformation for *obsolescence trap avoidance* (Ates and Acur, 2022) *Strategic Planning* • *User-generated content and user experience tracking are very important aspects* to address for reaching and sustaining Digital Business Model maturity; *but a high proportion of surveyed companies did not pay due attention* to their implementation (Spremic *et al*., 2024) • Identifying *appropriate strategies for mitigating any negative impact*; legality, security and human error are key smart contract challenges that impact SME digital resilience (Zirar *et al*., 2024) • *Integrated approach is needed* (between sustainable digitalisation and digital sustainability) (Ogrean and Herciu, 2021) • The *interplay of sustainability orientation and digital orientation* can create stronger digital business model innovation, but the synergy between them will be weakened in more dynamic environment (Xie *et al*., 2024) • Identify the *transformation drivers* and readiness to apply digital technologies; *Rethink the business sector if the driver and technology niches* and existing specific skills and competencies can be identified (Gregurec *et al*., 2021) • The success of implementing and adopting E-Commerce relies mainly on the *combination* and the awareness of *internal and external determinants* (Costa and Castro, 2021) • Improvements in the digital competencies of personal trainers' sports entrepreneurs, *the development of strategic plans and activities related to innovation/R&D and process improvements* are important measures to maintain the competitiveness of small sports businesses during crises (González-Serrano *et al*., 2023a) • *Scaffold is needed to support SMEs in the early stages of digitalisation* to increase understanding of core concepts, i.e. industry 4.0 concepts and available technologies, data handling, integration capability, upskilling and training, and strategic management capabilities (Hansen *et al*., 2025)	• Single digital innovation not necessary, not a singular digital innovation, diversify, combination • Digital leadership, entrepreneur identity motives, management competencies • Appropriate strategies, overcome internal and external barriers, rethink transformation driver, internal and external determinants, development of strategic plan, scaffold • Strategic alignment, internal factors determine digital business intensity, appropriate digital infrastructure • Frugal innovation, Ambidexterity, diverse digital strategies • Collaborative process, collaboration capabilities • Digital training, lack of technology skills, digital leadership, digital knowledge, knowledge acquisition, able to use

(*continued*)

Table 3. Continued

No.	Themes	Findings (from primary studies)	Keywords
		Strategic Alignment • SMEs should perform stakeholder governance, professionalise organisational culture, reinforce external orientation, proactively manage macro-factors, and *diversify investment in managerial human capital (sustainability ambitions and digital competencies)* (Isensee *et al*., 2023) • Internal factors (*management support, organisational flexibility, and risk-tolerant culture*) determine the impact of digital business intensity (Mladenova, 2024) • *Strategic alignment* between technological advances and organisational goals *emerges as essential*, especially for SMEs facing resources, regulatory compliance, and skills development challenges (Gouveia *et al*., 2024) • Entrepreneurs need to *invest in appropriate digital infrastructure*, like high-speed Internet, cloud, and secure computing, *to ensure the smooth running of digital activities* (Msomi and Ntuli, 2024) *Frugal Innovation and Ambidexterity* • SMEs need *to sharpen their internal competencies* SMEs must essentially be dynamic, forward-looking, and transformational in capturing the regional and global markets' opportunities (Hu and Kee, 2022) • Playing different roles within the same market (business-to-business and business-to-consumer) simultaneously, simultaneous entrance and managing multiple markets (*Ambidextrity*) and exploiting manufacturing knowledge for exploring product and business model innovation (*simultaneous learning processes*) is critical for resilience (Bettiol *et al*., 2023) • Business owners were resilient and established *diverse digital strategies* that helped them to keep their businesses afloat throughout the time of disruption (Ibidunni *et al*., 2022) • *Frugal innovation and ambidexterity* were *bridge the influence between digital business transformation and resilience of SMEs*; The role of share value relational capital, frugal innovation and ambidexterity variables can be a bridge to leverage the resilience of SMEs (Widiatmaka *et al*., 2024) *Collaboration* • *Collaborative process model* was suggested for such SMEs *to overcome internal and external barriers* to obtaining sustainability to strive towards more sustainable production (Rahnama *et al*., 2022) • Digital transformation, *collaboration capabilities*, and innovation value influence the resilience of SMEs. *The environment* for entrepreneurship and the digital transition *has an impact on the ups and downs of digital transformation* (Sulastri *et al*., 2023) *Digital Capability* • Identified barriers are categorised as IT adoption barriers, *lack of in-house technology skills*, readiness barriers, and adverse operational realities (Kumar *et al*., 2024b) • *Digital leadership* and empowerment affecting organisational performance; *digital training* affecting organisational performance in terms of employee capability (Lathabhavan and Kuppusamy, 2024) • Uncertain environment encourages SMEs to go digital. However, *resilient companies require less external financial support to achieve their digitalisation goals* (Ori *et al*., 2024) • *Digital sensing, digital seizing, and digital reconfiguration capabilities* effectively coordinate the survival process (Saka *et al*., 2025) • The impact of digital resources on resilience fully *mediated by digital platform capability*, connecting digital resources to SME growth (Aghazadeh *et al*., 2024) • Scaffolding approach to *competence development can enable knowledge acquisition and the formation of digital transformation strategies* (Hansen *et al*., 2025) • SMEs facing technological barriers (e.g. *digitalisation and forecasting capabilities*) for resilience (Sharma *et al*., 2024) • *ICT skills* can increase employment and decrease social exclusion (Avram *et al*., 2019) • SMEs should be *able to use digital communication channels*, such as social media, to create value streams by using relationship management and feedback management (Klein and Todesco, 2021) • Majority of entrepreneurs possessed a *relatively high level of knowledge* about cybersecurity (Radzi *et al*., 2024) • SMEs' previous *knowledge and technological resources and capabilities*, and collaboration networks with providers are found to trigger the adoption of digital technology (Holl and Rama, 2024)	

Source(s): Authors' own work

4.2.2 Theme 2: digital transformation as a lever for resilience. 4.2.2.1 Digital transformation leveraging SMEs' business capability. In this theme, we found that digital transformation is a key factor enabling SMEs to adapt by leveraging their existing business capabilities to achieve better performance. The primary articles indicate that digital tools can enhance SMEs' capabilities in various areas, such as managerial work and internal operations through communication technology (Akpan *et al*., 2024; Audretsch and Belitski, 2021), marketing through digital marketing (Ballerini *et al*., 2023; Hossain *et al*., 2022; Roman and Rusu, 2022), flexible financial services through mobile money (Nan and Park, 2022), learning and upskilling through virtual training (Awad and Martin-Rojas, 2024), and collaborative work through digital collaborative platforms (Han and Trimi, 2022; Sulastri *et al*., 2023). We use the term business capability to refer to these capabilities in general. According to Derguech *et al*. (2017), business capability refers to a company's actions in service, business processes, and tasks that enrich both functional and non-functional properties within the company. El Sawy and Pavlou (2008) argue that business capability generally refers to operational capabilities that enable a company to execute substantive day-to-day activities effectively. However, in a turbulent environment, business capability also requires dynamic capabilities, which allow the effective reconfiguration of existing operational capabilities to match changes in the business environment, and improvisational capabilities, which provide the learning ability to reconfigure existing resources spontaneously (El Sawy and Pavlou, 2008). In this context, we argue that these additional capabilities remain relevant in representing the various capabilities enhanced through the adoption of digital technology, as identified in the primary articles. Therefore, we use the term business capabilities to describe the capabilities SMEs may gain through digital transformation initiatives.

Digital transformation, whether applied to specific areas or the entire business process, enables SMEs to enhance their adaptability and agility during a crisis. This adaptability leads to greater business resilience in times of crisis or adverse events. Digital transformation allows SMEs to expand their market reach through digital marketing and sales, conduct flexible and efficient financial activities via digital financial services, facilitate remote working through online collaborative platforms, manage business operations and manufacturing processes through ERP systems, and improve learning capabilities through online training, digital resources, and virtual meeting platforms. These opportunities stimulate innovation in products, services, and business models, enable quick responses to changing environments, and increase overall business value, thereby fostering business resilience. In this context, digital transformation moderates the relationship between business capability and SME resilience. It strengthens the impact of business capability on SMEs' adaptability and agility and increases the likelihood of SMEs achieving resilience.

We highlight several keywords from the primary articles that support the understanding that digital transformation acts as a moderating variable. Senin *et al*. (2024) found that digital technologies provide SMEs with the digital capabilities necessary for resilience in facing uncertainty in the business environment. Furthermore, Awad and Martin-Rojas (2024) highlight that digital transformation can enhance existing business capabilities, enabling SMEs to thrive amidst challenges and remain competitive. Cong *et al*. (2024) and Khalil *et al*. (2022) found that digital inclusion empowers SMEs to manage e-commerce, implement remote work, and adopt electronic information systems, allowing them to operate during restrictions. This enables SMEs to experience a less pronounced immediate decline and a quicker recovery (Bachtiar *et al*., 2023; Cong *et al*., 2024). Digitalisation can compensate SMEs for restrictions by sustaining business activities through digital tools (Bachtiar *et al*., 2023; Hrivnák *et al*., 2021). Based on these findings, the keywords are equip digital capabilities, enhance existing business capabilities, empower, enable work during restrictions, and compensate for restrictions. This relationship indicates that digital transformation moderates SMEs' business capabilities by improving them, increasing the likelihood of SMEs' adaptability during crises and contributing to their resilience.

From a *managerial perspective*, exploiting new digital tools and markets would drive business innovation and modify business models, facilitating managerial work and enhancing internal operations (Akpan *et al*., 2024; Audretsch and Belitski, 2021). It will improve situational awareness, vulnerability management, and adaptive capacity, contributing to the stability of firm performance during periods of uncertainty (Akpan *et al*., 2024; Audretsch and Belitski, 2021; Robertson *et al*., 2022). More specifically, generative AI offers transformative potential for SMEs by automating processes, improving decision-making, and fostering innovation that strengthens management's adaptive capability and enables firms to navigate uncertainties (Carayannis *et al*., 2024; Saleem *et al*., 2023). Khurana *et al*. (2022) argued that digital transformation encourages SMEs to develop second-order dynamic capabilities in their businesses, which facilitates the emergence of resilience capability. Velu *et al*. (2019) argued that the appropriate use of digital technology mediates the effect of positive behavioural capital on organisational resilience.

In relation to *marketing and sales* activities, Ballerini *et al*. (2023), Hossain *et al*. (2022), and Roman and Rusu (2022) found that SMEs using digital platforms for digital marketing and sales purposes deliver added value through service innovations and achieve success and profitability during crises. The wider adoption of digital marketing tools helps SMEs meet the evolving needs of their customers, aligning their offerings with new requirements and trends (Sheresheva *et al*., 2021). Regarding access to financial resources, digital financial inclusion enables SMEs to obtain financial access, addressing financial resource constraints and providing technical assistance and information simultaneously (Jin and Liu, 2025). In this context, SMEs should also be mindful of cybersecurity issues. Greater knowledge in using information systems and managing cybersecurity challenges enhances competitiveness (Westerlund, 2020).

Furthermore, in relation to *learning and upskilling* activities, digital technologies can facilitate organisational learning and enhance learning capacity through online and virtual training platforms (Awad and Martin-Rojas, 2024). These learning and upskilling activities simultaneously stimulate innovation, improve adaptability to market fluctuations, and enable SMEs to capitalise on emerging opportunities (Awad and Martin-Rojas, 2024). Besides supporting learning activities, digital technology facilitates knowledge creation through knowledge management strategies. Knowledge-intensive processes on digital platforms play a crucial role in fostering innovation to address crisis management and efficiently enhance resilience (Guo *et al*., 2023).

Regarding *collaborative work*, integrating digital technologies with relevant data science platforms standardisation can help SMEs implement effective collaboration with partner organisations (Han and Trimi, 2022). Han and Trimi (2022) and Sulastri *et al*. (2023) found that digital transformation can help SMEs implement collaborative work. Digital tools facilitate SMEs to conduct collaborative work remotely or through virtual workspaces, making collaboration more flexible and agile (Eriksson *et al*., 2022; Isensee *et al*., 2023). Additionally, digital tools can improve communication between SMEs and their customers, allowing for continuous communication, engagement, and intimacy, which are important for managing customer relationships (Eriksson *et al*., 2022; Velu *et al*., 2019). In this context, digital technology enables SMEs to implement more effective and agile collaborative work, which is expected to benefit the resilience of SMEs.

4.2.2.2 Digital transformation enabling SMEs' adaptability. The extensive use of digital tools moderates the relationship between digital initiatives and resilience in enhancing adaptive capacities (Sinha *et al*., 2024). Digital technology utilisation enables SMEs to reduce missed opportunities and consolidate intellectual capital, thereby increasing their responsiveness to market volatility (Trieu *et al*., 2023; Wang *et al*., 2024). Similarly, González-Serrano *et al*. (2023a) found that increased use of technologies in the digitisation of sports services during the pandemic was essential for maintaining sports business performance. Significant efforts to exploit opportunities from digital transformation make SME actors more professional as entrepreneurs, which in turn increases entrepreneurial confidence (Gergely *et al*., 2024). Conversely, the inability to take advantage of digital

technology significantly reduces businesses' opportunities to pursue new competitive advantages, diversify activities, and build resilience in challenging environments, posing a potential threat to their sustainability (Morris *et al*., 2022). In this context, primary studies indicate that digital transformation enables SMEs to successfully leverage existing resources through digital tools and improve their ability to identify opportunities, innovate their business models, and adapt in times of crisis.

4.2.2.3 Digital transformation enabling SMEs' agility. Waty *et al*. (2023) found that digital transformation enhances resilience by enabling the business agility of SMEs. Sheresheva *et al*. (2021) reported that using digital marketing tools helps SMEs create new value for customers in line with current requirements and trends. Furthermore, Ramadan *et al*. (2023) found that adopting digital transformation leadership fosters organisational agility, enabling business model innovation. IT competencies allow SMEs to reduce missed opportunities, increase responsiveness to market volatility, and enhance business performance (Trieu *et al*., 2023). Business agility is an organisation's ability to respond to unexpected events, enabling SMEs to shift quickly from one strategy to another, resulting in greater manoeuvrability (Lengnick-Hall *et al*., 2011). This responsiveness requires adaptability to ensure environmental fit, which is necessary when SMEs must renew and transform their business to address unforeseen events (Lengnick-Hall *et al*., 2011). Therefore, agility results from adaptability, enabling SMEs to continuously change and innovate in response to market needs, which is critical for maintaining resilience during crises. Waty *et al*. (2023) argue that business agility requires various organisational aspects, such as networking capabilities, entrepreneurial orientation, and business model innovation. In this situation, the primary studies indicate that digital transformation enables SMEs to be agile by improving their business capability and innovating their business model through the utilisation of digital tools.

4.2.3 Theme 3: digital transformation is influenced by multiple factors. In this theme, we found that digital transformation is not the sole factor in generating SME resilience. As noted in the previous theme, digital transformation helps existing businesses operate more effectively by creating new business value. Furthermore, we identify several key factors that SMEs should consider to enhance the effectiveness of their digital transformation initiatives. Without appropriate utilisation, digital tools become a wasted investment. According to Wang and Sun (2025a, b), and Soomro and Khan (2024), digital transformation alone does not foster organisational resilience. SMEs require multi-dimensional digital innovation synergy to enhance organisational resilience effectively (Wang and Sun, 2025b). Interactions among various digital innovations are essential to comprehensively support complex business activities (Soomro and Khan, 2024; Wang and Sun, 2025a). Similarly, Sagala and Óri (2025a) found that multiple critical values are needed for SMEs to achieve successful digital transformation, including dynamic capabilities, digital capability, digital inclusion, leadership orientation, learning and knowledge management, and collaboration. Based on the primary article findings, we elaborate on our results and outline the identified critical factors of SME resilience that interact with digital transformation. We presented leadership at the individual level, and strategic planning, strategic alignment, frugal innovation and ambidexterity, collaboration, and digital capability at the organisational level.

4.2.3.1 Leadership. At the individual level, the SME owner-manager is the central actor driving business innovation. Their actions are crucial in coping with adversity and generating resilience within their business. Therefore, individual capability and leadership orientation are key factors in transforming business models to generate organisational resilience (Smith *et al*., 2022). In this context, the SME leader must maintain a positive mindset to accept and cope with uncertainty, understand the current business situation, and manage appropriate business innovation (Branicki *et al*., 2018; Hartmann *et al*., 2022; Hillmann and Guenther, 2021). SME leaders need to develop personal adaptability and adjust their leadership orientation to the current business context.

The primary articles propose various leadership orientations that SME leaders could adopt in turbulent environments, including thought leadership, situational leadership, paradoxical

leadership, empowering leadership, and digital leadership. Thought leadership enables SME leaders to identify the main problem in the business and create a solution immediately (Joseph *et al*., 2022), while situational leadership encourages SME leaders to develop agile strategies that are adaptable to the dynamic business environment (Hasayotin *et al*., 2024; Robertson *et al*., 2022; Silva *et al*., 2023). Additionally, empowering leadership can help SME leaders optimise existing organisational knowledge by engaging employees to generate innovation and enhance their knowledge and skills, thereby fostering entrepreneurial abilities and creating new value in specific or overall business processes (Hasayotin *et al*., 2024; Lathabhavan and Kuppusamy, 2024). In this context, the SME leader should also cultivate an innovation culture as a shared value within the company (Joseph *et al*., 2022). Furthermore, digital leadership enables SME leaders to apply technological knowledge and use various digital channels to identify new opportunities and innovate the business (Lathabhavan and Kuppusamy, 2024; Ramadan *et al*., 2023; Robertson *et al*., 2022; Silva *et al*., 2023).

With regard to digital initiatives, digital transformation requires SME leaders to possess management competencies in digital leadership to initiate business model innovation and design effective digital transformation strategies that foster organisational agility (Ramadan *et al*., 2023). Understanding their business situation and current digital technology trends is essential (Zirar *et al*., 2024). Maintaining the focus of digital transformation on resolving company challenges during crises and uncertainty is critical, so SME leaders can ensure digital investment effectively addresses the relevant business problems. To overcome the limitations of existing knowledge, researchers argue that SME leaders should manage a robust knowledge management system (Kumar *et al*., 2024b; Ramadan *et al*., 2023). By avoiding obsolescence and developing agility, SME leaders can ensure successful digital transformation (Ates and Acur, 2022). Therefore, digital transformation requires digital leadership, knowledge management, and monitoring and control competencies to enhance resilience among SMEs (Kumar *et al*., 2024b).

4.2.3.2 Strategic planning. Primary articles indicate that SMEs need to develop a clear strategic plan. First, SMEs must assess their current business state. They should identify their transformation drivers to prepare for digital transformation and enhance resilience (Ogrean and Herciu, 2021; Smith *et al*., 2022). SMEs can evaluate their technology niches, existing knowledge and competencies, marketing, operations, finance, and entrepreneurial orientation to determine which specific business aspects, scope, and level to digitalise (Costa and Castro, 2021; González-Serrano *et al*., 2023b; Gregurec *et al*., 2021; Xie *et al*., 2024). Additionally, SMEs should connect assessment results from each business aspect to gain a comprehensive understanding of their business circumstances in relation to adversity or disruptions. The interplay and synergy of these multiple business aspects in the initial assessment can create a more robust business model (Costa and Castro, 2021; González-Serrano *et al*., 2023b; Xie *et al*., 2024). SMEs should also develop clear strategic plans, design frameworks, and implement process improvements to ensure digital transformation delivers competitiveness and business resilience (González-Serrano *et al*., 2023a; Hansen *et al*., 2025; Smith *et al*., 2022). Transparent yet flexible strategic planning and its framework are required in the early stages of digital transformation to enhance SMEs' understanding of core digitalisation concepts, potential technologies, data management, integration capability, upskilling and training, and strategic management capabilities throughout the digital transformation journey (Hansen *et al*., 2025; Mladenova, 2024). This approach helps SMEs develop business models tailored to their specific circumstances and adaptable in times of crisis, which is essential for achieving and maintaining digital business model maturity (Spremic *et al*., 2024). However, few SMEs focus on proper initial assessment, transparent strategic planning, and the phases of digital transformation (Hansen *et al*., 2025; Spremic *et al*., 2024). Mishandling digital transformation can result in wasted digital investment rather than increased business resilience.

4.2.3.3 Strategic alignment. Msomi and Ntuli (2024) found that SMEs need to invest in appropriate digital infrastructure, such as high-speed internet, digital devices, supportive software, and secure computing, to ensure the smooth running of digital activities. However,

the appropriate digital infrastructure varies between SMEs, depending on multiple factors present within each organisation. In times of crisis, each SME may face different challenges related to the company's characteristics and specific circumstances. Therefore, strategic alignment between digital infrastructure and organisational goals, existing resources, and regulatory compliance is critical to ensure the effectiveness of digital transformation, enabling SMEs to optimise their business resources and achieve their business goals without violating regulations (Gouveia *et al*., 2024). In this context, SMEs should consider internal factors such as managerial competence, organisational flexibility, and risk tolerance to determine the intensity of digital investment in their existing business (Mladenova, 2024). Bettiol *et al*. (2023) found that leveraging existing knowledge to explore new business models is critical for resilience. Strategic alignment will also guide SMEs to diversify investment in both digital infrastructure and business infrastructure, such as knowledge, culture, and governance (Isensee *et al*., 2023). SMEs should clearly understand their specific business challenges, the needs and requirements of particular digital technologies, and the general compliance of those technologies. This understanding is crucial for aligning their digital strategy to ensure resilience during a crisis.

4.2.3.4 Frugal innovation and ambidexterity. Research commonly recognises that SMEs have limited technological, human, and financial resources (Corvello *et al*., 2022; Sagala and Őri, 2025b). This issue becomes more critical during times of crisis. SMEs must manage their resources rigorously because digitalisation decisions are risky and consume financial resources, so they should deliver benefits related to adaptability and resilience rather than result in wasted investment. In this context, primary articles found that frugal innovation and ambidexterity are types of innovation suitable for SMEs (Bettiol *et al*., 2023; Sagala and Őri, 2025b; Widiatmaka *et al*., 2024). Widiatmaka *et al*. (2024) found that frugal innovation and ambidexterity bridge the influence between digital business transformation and the resilience of SMEs. Frugal innovation involves small-scale innovation implemented continuously in line with business growth and digital investment needs. Similarly, ambidexterity is the ability to optimise existing resources while simultaneously exploring new ones (Sagala and Őri, 2025b). In practice, Bettiol *et al*. (2023) recommend that SMEs simultaneously exploit existing markets and explore and enter multiple markets to diversify their roles within the same market, such as business-to-business and business-to-consumer. Business owners could also diversify digital strategies by exploiting existing technology and exploring other affordable digital strategies in line with their strategic planning (Ibidunni *et al*., 2022). That ambidexterity could help them keep their technological businesses updated and afloat throughout disruption (Ibidunni *et al*., 2022). In this context, internal competencies become critical for sustainable exploitation and exploration. In addition, SMEs should be dynamic, forward-looking, and transformational in capturing market opportunities (Hu and Kee, 2022). These strategies can help SMEs survive by exploiting existing markets while gradually entering new markets and delivering new business values to increase the likelihood of resilience.

4.2.3.5 Collaboration. To address resource limitations, SMEs could initiate collaboration. Collaboration can be a strategic solution for SMEs to overcome limited resources. Rahnama *et al*. (2022), Sulastri *et al*. (2023), and Ashiru *et al*. (2023) suggested collaboration as a way for SMEs to overcome internal and external barriers to achieve resilience, which is critical for activating resilience. Collaboration can be implemented internally or externally. For internal collaboration, SME leaders could work with knowledgeable employees to facilitate multidisciplinary knowledge exchange, discussion, idea generation, and multi-skilled collaborative work to solve various business problems (Audretsch and Belitski, 2021). Business owners could promote collaborative work through profit-sharing agreements between internal parties (Sagala and Őri, 2025a). This mechanism could provide mutual benefits for SME owners and knowledgeable internal parties in managing resource limitations. Furthermore, external collaboration could bridge the knowledge and resource gap between partnering SMEs. SMEs can also involve business partners or customers as channels to obtain external information, which is essential for initiating innovation. SMEs could also initiate

multi-stakeholder collaboration with various entities, such as other SMEs, larger corporations, government agencies, and research organisations, to address their resource and knowledge limitations, which could help solve business problems in multiple areas (Isensee *et al*., 2023). In this context, SMEs could also establish profit-sharing agreements with external parties that support specific business challenges. Profit-sharing agreements could help overcome SMEs' financial limitations by fostering mutually beneficial collaborations. This approach not only expands the pool of resources but also diversifies the perspectives and expertise involved. However, SMEs must pay close attention to ensuring fair distribution of benefits to all parties through a mutual benefit contract (Gouveia *et al*., 2024).

4.2.3.6 Digital capability. SMEs require continuous learning and digital capability development to address knowledge limitations and enhance digital capability (Kumar *et al*., 2024a). Kumar *et al*. (2024a) and Sharma *et al*. (2024) found that a significant barrier to technology adoption in SMEs is the lack of internal technology skills and digital capabilities, which adversely affect operational digital activities. However, with appropriate digital skills, SMEs can overcome these barriers and create value. Aghazadeh *et al*. (2024) found that the effect of digital resources on resilience is fully mediated by digital platform capability. Mladenova (2024) and Saka *et al*. (2025) also found that SMEs' existing technological knowledge, resources, and capabilities prompt them to recognise and adopt potential digital technologies. Digital skills enable SME leaders and employees to effectively pursue the digital business agenda and, in turn, allow SMEs to use digital tools appropriately to create value (Avram *et al*., 2019; Klein and Todesco, 2021; Radzi *et al*., 2024; Saka *et al*., 2025). In this context, primary articles indicate that initial knowledge related to digital capability is necessary to begin digital transformation. Furthermore, during the digital transformation process, SMEs can enhance their knowledge through learning and upskilling. According to Lathabhavan and Kuppusamy (2024), sustainable digital training is essential for lasting improvement, as it enhances employee digital skills and further improves organisational performance. A scaffolding approach to competence development is also crucial for continuous knowledge acquisition and for fostering digital transformation strategies (Hansen *et al*., 2025). In relation to the continuous learning and upskilling agenda, once SMEs decide to initiate digital transformation, more opportunities for learning and upskilling become available. As mentioned in previous themes, digital transformation can provide SMEs with broad access to virtual training, digital communities, and distance coaching, enabling engagement in learning and upskilling processes. Continuous learning and upskilling will improve SMEs' digital capability during digital transformation and simultaneously enhance business capability, which, in turn, contributes to SMEs' resilience.

5. Discussion and conceptual framework proposal

The present study identifies the role of digital transformation in enabling SME resilience and the key factors contributing to digital transformation in addressing resilience. In this study, we limited the observation of SME resilience to the response of SMEs during times of crisis or disturbance. Therefore, the analysis focuses on the crisis period rather than long-term outcomes after the crisis. However, resilient SMEs also demonstrate their readiness to face future crises or disruptions. The thematic analysis revealed that digital transformation enhances SMEs' business capabilities, which improves their adaptability and agility, thereby fostering SME resilience. Furthermore, the study identified several antecedents of successful digital transformation in achieving resilience.

According to the theoretical background, SME resilience is defined as the ability of SMEs to respond to unexpected disruptions, to recover and return to the pre-disturbance state after disruption, and to learn from experience to anticipate future disruptions through flexible and innovative solutions (Bhamra *et al*., 2011; Kamalahmadi and Parast, 2016; Yao and Fabbe-Costes, 2018). In this study, we focused the concept of SME resilience on the ability to respond during disturbance (see: Branicki *et al*., 2018; Conz and Magnani, 2020; Wang and

Sun, 2025b). This response ability, related to adaptability and innovation capabilities, refers to how SMEs perform during a crisis (Duchek, 2020; Al Omoush *et al*., 2025; Sagala and Őri, 2025b). Furthermore, the thematic analysis findings indicate that digital transformation is a lever for SME resilience by improving business capability, adaptability, and agility. These findings support the importance of enhancing business capability to prepare companies to face disturbances (Sheffi and Rice, 2005; El Sawy and Pavlou, 2008). Additionally, these findings bridge the connection between El Sawy and Pavlou (2008), Teece *et al*. (2016), Branicki *et al*. (2018), Conz and Magnani (2020), Wang and Sun (2025b), and Vasi *et al*. (2024) regarding how digital transformation can be designed to improve business capability, enabling adaptability and agility during uncertainty caused by a crisis. Transformation during a crisis can be achieved by leveraging resources saved during stable periods to innovate in times of crisis (Teece *et al*., 2016; Leppäaho and Ritala, 2022; Vasi *et al*., 2024). In this respect, we reinforce the concept of reconfiguring existing resources to transform businesses, as outlined in the dynamic capabilities framework (Teece *et al*., 2016).

The ability of SMEs to reconfigure existing skilled employees, innovative ideas, resources, and technologies to pursue new opportunities demonstrates their adaptability (Conz and Magnani, 2020). Additionally, the capacity of SMEs to respond quickly and redirect company resources and strategic direction towards value creation and higher-yield, value-protecting activities to ensure sustainability demonstrates their agility (Teece *et al*., 2016; Conz and Magnani, 2020). In these definitions, adaptability and agility are described almost synonymously but are still regarded as critical factors for managing uncertainties and considering reconfiguration, whether incremental or radical, as essential traits (Teece *et al*., 2016). In this study, we propose adaptability and agility as points along a continuum. Adaptability enables SMEs to adjust their business models in response to business dynamics, thereby enhancing their business capabilities. Improved business capabilities increase robustness in absorbing shocks and activate SMEs' business agility. From a practical perspective, we propose adaptability and agility as key abilities that SMEs should prioritise in their digital transformation agenda during periods of crisis and disruption.

The current study found that digital technology enables SMEs to continue operating during restrictions by implementing e-commerce, supporting remote managerial work through electronic information systems, helping SMEs deliver greater service value through digital sales, expanding market reach via digital marketing, and facilitating learning and upskilling through online learning platforms and virtual meetings (Akpan *et al*., 2024; Audretsch and Belitski, 2021; Awad and Martin-Rojas, 2024; Ballerini *et al*., 2023; Han and Trimi, 2022; Nan and Park, 2022; Sulastri *et al*., 2023). Therefore, we argue that the critical role of digital transformation lies in enhancing business capability to reconfigure the business model or the business process, and in creating new business value to anticipate shocks and seize more opportunities amidst business challenges. This new business value is expected to improve the adaptability and agility of SMEs.

Additionally, digital transformation requires SMEs to reconfigure their business models, which can be understood as business model innovation (Costa and Castro, 2021; Smith *et al*., 2022; Xie *et al*., 2024). This agenda is part of the transformation stage in the dynamic capabilities framework (Teece, 2007). It involves implementing new approaches to create greater value by identifying innovative revenue-generating methods and developing a unique value proposition (Casadesus-Masanell and Zhu, 2013). These findings complement those of Khurana *et al*. (2022), who highlighted the importance of technological adoption in enhancing dynamic capabilities and the resilience of SMEs. According to the thematic analysis, digital transformation represents the realisation of SMEs' dynamic capabilities, enabling them to adapt and remain agile in the face of crises. This concept aligns with El Sawy and Pavlou (2008) and Teece *et al*. (2016), who advocate technological adoption to create new competitive advantages that meet the evolving requirements of the changing business environment.

Furthermore, the current study found that multiple factors influence digital transformation. Digital transformation requires an appropriate strategy to ensure its success in fostering SME

resilience. Firstly, leadership at the individual level is critical for initiating and executing digital transformation. The SME leader is the key driver of digital initiatives (Smith *et al*., 2022). These findings are consistent with previous studies, which argue that SMEs have a centralised structure and decision-making process, so innovation initiatives depend on the SME leader (Hu and Kee, 2022; Joseph *et al*., 2022). Moreover, the entrepreneurial resilience of the SME leader is a key antecedent to promoting change at the organisational level, leading to organisational resilience (Branicki *et al*., 2018; Leonelli *et al*., 2025). Therefore, leadership orientation and approaches are determining factors for successful digital transformation initiatives at the organisational level of SMEs. These include thought leadership, situational leadership, paradoxical leadership, empowering leadership, and digital leadership (Smith *et al*., 2022; Hasayotin *et al*., 2024; Robertson *et al*., 2022; Silva *et al*., 2023). In addition, SME leaders must maintain a positive mental state to understand the current business situation during a crisis and manage appropriate business innovation (Branicki *et al*., 2018; Hartmann *et al*., 2022; Hillmann and Guenther, 2021).

At the organisational level, we identified strategic planning, strategic alignment, frugal innovation and ambidexterity, collaboration, and digital capability as critical for ensuring the impact of digital transformation on SMEs' resilience. These findings support previous research by Al Omoush *et al*. (2025), which proposes frugal innovation and ambidexterity as suitable strategies for initiating digital transformation in SMEs, given their resource constraints. These findings also support the concept of resourcefulness in building resilience by optimising existing resources to initiate digital transformation and leveraging social networks for collaboration to access complementary resources (see: Conz and Magnani, 2020; Wang and Sun, 2025b; Powell, 2011). Furthermore, these findings address the ambiguity surrounding digital transformation initiatives among SMEs by emphasising business-IT alignment and the importance of clear strategic planning for digital transformation (see: Klein and Todesco, 2021; Pelletier and Cloutier, 2019; Leonelli *et al*., 2025; Florez-Jimenez *et al*., 2024).

Clear strategic planning and a structured approach to digital transformation are essential to provide SMEs with a measurable strategy and enable ongoing adjustment and improvement (González-Serrano *et al*., 2023a; Hansen *et al*., 2025; Smith *et al*., 2022). Continuous refinement and improvement are necessary to maintain business adaptability and agility, which are key components of SME resilience (Isensee *et al*., 2023). SMEs should also adopt strategies appropriate to their specific business challenges during crises to ensure that digital investments deliver business value and address particular business problems.

Furthermore, as SMEs have limited resources, frugal innovation and ambidexterity are considered suitable approaches for initiating digital transformation. These approaches enable SMEs to exploit existing resources and continuously implement small innovations to generate sustainable business innovation (Corvello *et al*., 2022; Sagala and Őri, 2025b). They also help SMEs gradually develop adaptability and agility appropriate to their current business capabilities and resource availability (Ibidunni *et al*., 2022), resulting in a lasting impact on SMEs' resilience. In addition, we propose collaboration as an alternative strategy to help SMEs address resource limitations in digital transformation initiatives (Audretsch and Belitski, 2021; Corvello *et al*., 2023). In this context, the current study views collaboration as an opportunity for SMEs to enable digital transformation during periods of uncertainty, crisis, or resource constraints. SMEs can bridge the resource gap through internal collaboration with knowledgeable employees or external collaboration with business partners, IT providers, potential investors, government bodies, or customers. In times of crisis, limited resources increase the challenge for SMEs to achieve resilience and simultaneously heighten the risk of initiating digital transformation. In such situations, collaboration can help SMEs reduce the risks associated with digital investment and enable progress even during periods of disruption through collaboration agreements involving technology sharing, IT consultancy, or financial resource sharing. SME owners can collaborate with internal parties who possess digital capabilities to manage digital transformation projects through profit-sharing agreements. These agreements can also be extended to external partnerships, such as technology sharing

with established IT companies or consulting services with IT firms. This strategy can help SMEs overcome limitations related to IT knowledge, resources, and financial capacity.

To foster innovation in digital transformation, SMEs must enhance their digital skills by developing digital capability. Digital capability plays a crucial role during digital transformation in a changing business environment, as it ensures the workforce is equipped with the necessary skills to manage change (Kumar *et al*., 2024a; Sharma *et al*., 2024). Market expectations can shift rapidly in a dynamic business environment, and competition may intensify. Therefore, expectations regarding digital services may also evolve quickly. SMEs must remain aware of these dynamics and continuously update their knowledge to ensure their digital innovation aligns with market expectations (Mladenova, 2024; Saka *et al*., 2025; Klein and Todesco, 2021). Learning and skill development help SME actors to continuously improve and refine their digital transformation strategy. Continuous improvement enhances adaptability and agility, which are critical for maintaining resilience. The conceptual framework illustrating the relationship between digital transformation and SME resilience is presented in Figure 2.

6. Future research agenda

According to the research findings and the reconstructed framework, we propose several further research agendas as follows:

(1) Field studies on successful resilient SMEs as benchmark models.

The conceptual framework identifies several critical antecedents of digital transformation and highlights the role of digital transformation in enhancing business capabilities among SMEs. Additionally, the framework presents adaptability and agility as a continuum leading to

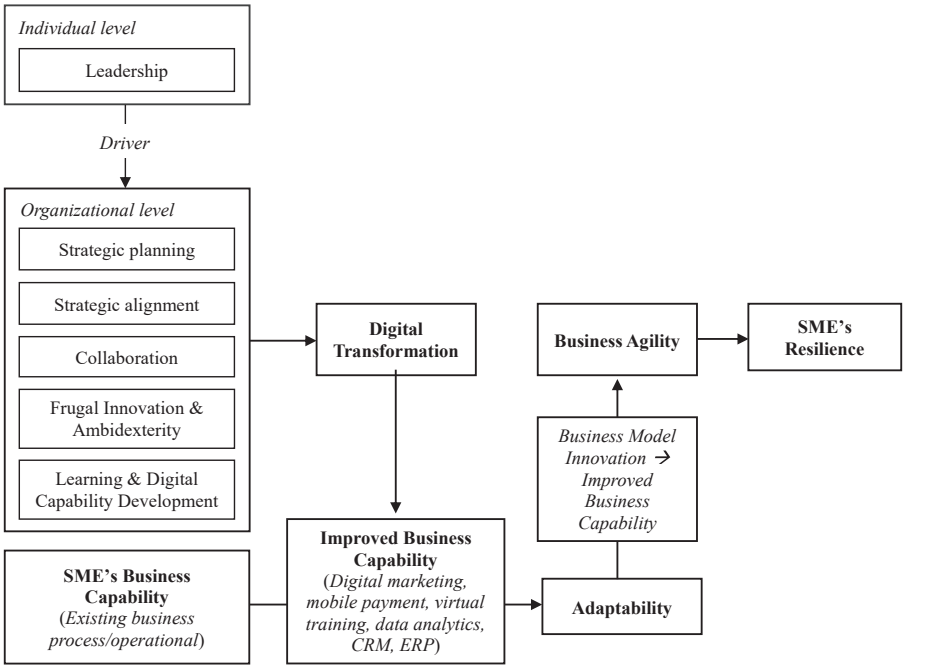

Figure 2. Relationship of Digital Transformation and SMEs Resilience Framework. Source: Authors' own work

resilience. However, practical explanations are still required for SME practitioners, particularly those in developing countries and emerging markets. The evidence supporting these proposals should be further explored through the experiences of established SMEs. This will provide new theoretical insights in the business field and explicit practical knowledge to facilitate the adoption of digital transformation and resilience strategies among SMEs. Therefore, exploring practical knowledge from existing successful SMEs is essential. This could be achieved through phenomenological or experimental research, which is valuable for documenting the best practices of successful SMEs.

(2) Further empirical investigation of the SME resilience framework.

The proposed framework was developed from research findings in previous studies and does not take SME characteristics into account. The conceptual framework still requires empirical investigation. The critical success factors may vary according to business sector, region, market segmentation, and organisational culture. Therefore, empirical investigation within specific populations and refinement of SME business and digital transformation models should be carried out through empirical studies. Furthermore, empirical investigation of the relationship between digital transformation, adaptability, agility, and resilience should be conducted to obtain empirical evidence for the theoretical proposal.

(3) Internal validation of the conceptual framework.

Internal validation of the framework can be achieved through expert validation using focus group discussions or the Delphi method. This internal validation could enhance the internal consistency of the theoretical justification for the conceptual framework.

(4) Investigate SMEs' resilience in non-crisis adversity.

The current study found that research on SME resilience has grown exponentially during and after the COVID-19 pandemic. We argue that the primary studies reviewed in this study mostly define adversity as a crisis, specifically related to the COVID-19 pandemic. However, in reality, SMEs have faced high uncertainty and intense competition over the past 2 decades. OECD (2016) stated that the survival rate of SMEs in the first five years is only 30%. This data indicates that SME resilience was already an essential issue for SMEs even before crises such as COVID-19. Therefore, further analysis of the proposed framework for SMEs in the context of non-crisis adversity would improve its robustness. Non-crisis factors, which refer to dynamic, uncertain, challenging, and highly competitive market conditions in addition to crises and disasters, should be a focus for future research.

7. Conclusion

The current study found that digital transformation is a critical moderator that enhances business capabilities to achieve SME resilience. Digital transformation enables SMEs to leverage their existing resources and business capabilities to operate more effectively and stimulate innovation, creating new business value. According to El Sawy and Pavlou (2008), business entities require a new composition of business capabilities when facing crises and uncertainty, consisting of operational, dynamic, and improvisational capabilities. These enable companies to reconfigure existing business processes and continuously update that configuration in response to a continuously changing environment. In this context, digital transformation enables SMEs to enhance their business capabilities, improving adaptability and agility, which leads to resilience. Digital transformation introduces SMEs to new business models that are better suited to new business environments resulting from shocks and crises. With these new business models, SMEs can delay disruption, manage strategies to cope with turbulence, promote new products or services, and recover quickly. This finding clarifies the role of digital transformation in enhancing business capabilities as part of the business resilience strategy of SMEs. This perspective aligns with Marchese *et al.* (2025), who

highlighted that digital technology plays a pivotal role in improving company capabilities in turbulent environments.

We propose relevant strategies as antecedents of successful digital transformation aimed at generating SME resilience. We incorporate these strategies into the frameworks of digital transformation and SME resilience strategy. In the proposed framework, we highlight owner-manager leadership as the primary determinant of digital transformation and SME resilience strategy. Owner-manager leadership is crucial for initiating digital transformation strategies at the organisational level. These findings strengthen those of Leonelli *et al*. (2025), Koporcic *et al*. (2025), and Branicki *et al*. (2018), who suggest that the entrepreneurial resilience of SME owner-managers is the critical driver of SME resilience strategy. We operationalise entrepreneurial resilience as the leadership of the SME owner-manager in initiating digital transformation as a strategy to generate business resilience. These findings also complement the interaction of individual and organisational levels in the SME resilience framework of Koporcic *et al*. (2025) by proposing an operational strategy for digital transformation at the organisational level of SMEs.

Furthermore, we propose strategic planning, strategic alignment, frugal innovation, ambidexterity, collaboration, learning, and digital capability development as key strategies for digital transformation initiatives of SMEs. This operational strategy is inspired by the throughput process of sustainability strategy (Damiano and Valenza, 2025) and the transformation phase of dynamic capabilities (Teece *et al*., 2016). We attempted to operationalise the strategy in response to the SMEs' specific situation, which includes an unclear business plan, risk of misalignment, resource scarcity, and lack of cognitive response (Kumar *et al*., 2024a; Razavi Hajiagha *et al*., 2024; Sagala and Őri, 2025a). The proposed strategy operationalises the concepts of relevant capabilities and lean thinking (Damiano and Valenza, 2025), as well as leveraging existing resources (Teece *et al*., 2016) in the transformation process, which are represented by learning, frugal innovation, ambidexterity, and collaboration in our proposed framework.

Additionally, we propose a digital transformation pathway, progressing from owner-manager leadership to operational strategy, and then to the development of business capabilities in SMEs, realised through business model innovation across various dimensions. Enhanced business capability increases adaptability, which in turn enables business agility in SMEs and ultimately leads to business resilience. We present adaptability, agility, and resilience as a continuum within the resilience strategy pathway for SMEs. This proposed pathway complements the work of Satpathy *et al*. (2025), Ashiru *et al*. (2023), and Aghazadeh *et al*. (2024) by detailing the process of developing business capability for resilience through adaptability and agility. The proposed framework provides a more direct route for digital transformation among SMEs, which is expected to reduce the risk of misinvestment in digital tools and mismanagement of digital strategy during the business resilience journey (Kumar *et al*., 2024a; Razavi Hajiagha *et al*., 2024; Sagala and Őri, 2025a).

Overall, this study contributes by reorganising the literature to identify the theoretical foundations regarding the importance of digital transformation in developing SME resilience and by constructing the pathway for digital transformation and resilience strategy. This literature review enhances understanding of the contribution of digital transformation to SME resilience as a moderator that improves business capability, rather than as a direct antecedent. Digital transformation leverages the existing business capabilities of SMEs. Enhanced business capability, in turn, enables the adaptability and agility of SMEs. These findings provide a more precise understanding of the relationship between digital transformation and SMEs' resilience. This contribution complements existing knowledge regarding the response ability, adaptability, and resourcefulness of SMEs during crises, as discussed by Wang and Sun (2025a), Conz and Magnani (2020), and Powell (2011). The proposed framework offers valuable guidance for SMEs embarking on digital transformation, enhancing adaptability, agility, and resilience. SMEs can clearly plan a targeted digital transformation agenda to support specific business tasks that improve their business capability, such as digital

marketing, digital finance, digital transactions, CRM tools, ERP tools, and collaboration platforms. At the same time, SMEs should consider appropriate strategies to enable digital transformation initiatives, such as supportive leadership, strategic alignment, collaboration, ambidexterity, and frugal innovation. The proposed framework can also assist educators in developing curricula that incorporate essential skills into the standard competencies for entrepreneurs, focusing on measurable digital transformation, agility, and resilience necessary for success in today's business environment.

As a limitation, this study reviewed only a limited range of articles published in the Scopus and WoS databases and was constrained by the scope of available research. Therefore, some areas related to SME resilience may remain unexplored. Additionally, the proposed framework was developed from the findings of the primary literature and may require refinement to better reflect the unique characteristics of specific SMEs, such as their size, culture, business idiosyncrasies, sector, and the economic context of their country. Finally, although the current research presents a framework based on a review of published articles, it requires further internal and empirical validation to enhance its robustness and credibility.

Supplementary material

The supplementary material for this article can be found online.

References

Aghazadeh, H., Zandi, F., Amoozad Mahdiraji, H. and Sadraei, R. (2024), "Digital transformation and SME internationalisation: unravelling the moderated-mediation role of digital capabilities, digital resilience and digital maturity", *Journal of Enterprise Information Management*, Vol. 37 No. 5, pp. 1499-1526, doi: 10.1108/JEIM-02-2023-0092.

Akpan, I.J., Effiom, L. and Akpanobong, A.C. (2024), "Towards developing a knowledge base for small business survival techniques during COVID-19 and sustainable growth strategies for the post-pandemic era", *Journal of Small Business and Entrepreneurship*, Vol. 36 No. 6, pp. 921-943, doi: 10.1080/08276331.2023.2232649.

Al Omoush, K., Lassala, C. and Ribeiro-Navarrete, S. (2025), "The role of digital business transformation in frugal innovation and SMEs' resilience in emerging markets", *International Journal of Emerging Markets*, Vol. 20 No. 1, pp. 336-386, doi: 10.1108/IJOEM-12-2022-1937.

Ali, M. (2021), "A systematic literature review of sustainable entrepreneurship with thematic analysis", *World Journal of Entrepreneurship, Management and Sustainable Development*, Vol. 17 No. 4, pp. 742-764, doi: 10.1108/WJEMSD-11-2020-0150.

Amaral, A. and Peças, P. (2021), "A framework for assessing manufacturing smes Industry 4.0 maturity", *Applied Sciences*, Vol. 11 No. 13, 6127, doi: 10.3390/app11136127.

Apostolopoulos, N., Makris, I., Apostolopoulos, S. and Dimitrakopoulos, P. (2024), "Resilience of rural micro-businesses in an adverse entrepreneurial environment: adapting to the energy crisis", *Journal of Enterprising Communities: People and Places in the Global Economy*, Vol. 18 No. 5, pp. 1023-1044, doi: 10.1108/JEC-08-2023-0144.

Ashiru, F., Nakpodia, F. and You, J.J. (2023), "Adapting emerging digital communication technologies for resilience: evidence from Nigerian SMEs", *Annals of Operations Research*, Vol. 327 No. 2, pp. 795-823, doi: 10.1007/s10479-022-05049-9.

Ates, A. and Acur, N. (2022), "Making obsolescence obsolete: execution of digital transformation in a high-tech manufacturing SME", *Journal of Business Research*, Vol. 152, pp. 336-348, doi: 10.1016/j.jbusres.2022.07.052.

Audretsch, D.B. and Belitski, M. (2021), "Knowledge complexity and firm performance: evidence from the European SMEs", *Journal of Knowledge Management*, Vol. 25 No. 4, pp. 693-713, doi: 10.1108/JKM-03-2020-0178.

Avelar, S., Borges-Tiago, T., Almeida, A. and Tiago, F. (2024), "Confluence of sustainable entrepreneurship, innovation, and digitalization in SMEs", *Journal of Business Research*, Vol. 170 No. 2023, 114346, doi: 10.1016/j.jbusres.2023.114346.

Avlijaš, S. (2022), "How regional integration agreements can foster inclusive growth: lessons from exporting SMEs in the Western Balkans", *Economic Annals*, Vol. 67 No. 235, pp. 67-94.

Avram, A., Benvenuto, M., Avram, C.D. and Gravili, G. (2019), "Assuring SME' s sustainable competitiveness in the digital era: a labor policy between guaranteed minimum wage and ICT skill mismatch", *Sustainability*, Vol. 11 No. 10, 2918, doi: 10.3390/su11102918.

Awad, J.A.R. and Martin-Rojas, R. (2024), "Digital transformation influence on organisational resilience through organisational learning and innovation", *Journal of Innovation and Entrepreneurship*, Vol. 13 No. 1, p. 69, doi: 10.1186/s13731-024-00405-4.

Bachtiar, N.K., Setiawan, A., Prastyan, G.A. and Kijkasiwat, P. (2023), "Business resilience and growth strategy transformation post crisis", *Journal of Innovation and Entrepreneurship*, Vol. 12 No. 1, p. 77, doi: 10.1186/s13731-023-00345-5.

Ballerini, J., Giordino, D. and Culasso, F. (2023), "Exports or public procurement to resist in the post-pandemic world? How e-commerce appeases this food and beverage SMEs ambidextrous dilemma", *European Journal of Innovation Management*, Vol. 26 No. 7, pp. 715-750, doi: 10.1108/EJIM-01-2023-0021.

Bansal, S., Jain, M., Garg, I. and Srivastava, M. (2022), "Attaining circular economy through business sustainability approach: an integrative review and research agenda", *Journal of Public Affairs*, Vol. 22 No. 1, e2319, doi: 10.1002/pa.2319.

Ben Slimane, S., Coeurderoy, R. and Mhenni, H. (2022), "Digital transformation of small and medium enterprises: a systematic literature review and an integrative framework", *International Studies of Management and Organization*, Vol. 52 No. 2, pp. 96-120, doi: 10.1080/00208825.2022.2072067.

Berbekova, A., Uysal, M. and Assaf, A.G. (2021), "A thematic analysis of crisis management in tourism: a theoretical perspective", *Tourism Management*, Vol. 86, 104342, doi: 10.1016/j.tourman.2021.104342.

Bettiol, M., Capestro, M., Di Maria, E. and Micelli, S. (2023), "Ambidextrous strategies in turbulent times: the experience of manufacturing SMEs during the COVID-19 pandemic", *International Journal of Physical Distribution and Logistics Management*, Vol. 53 No. 2, pp. 248-272, doi: 10.1108/IJPDLM-10-2021-0422.

Bhamra, R., Dani, S. and Burnard, K. (2011), "Resilience: the concept, a literature review and future directions", *International Journal of Production Research*, Vol. 49 No. 18, pp. 5375-5393, doi: 10.1080/00207543.2011.563826.

Branicki, L.J., Sullivan-Taylor, B. and Livschitz, S.R. (2018), "How entrepreneurial resilience generates resilient SMEs", *International Journal of Entrepreneurial Behaviour and Research*, Vol. 24 No. 7, pp. 1244-1263, doi: 10.1108/IJEBR-11-2016-0396.

Braun, V. and Clarke, V. (2006), "Using thematic analysis in psychology", *Qualitative Research in Psychology*, Vol. 3 No. 2, pp. 77-101, doi: 10.1191/1478088706qp063oa.

Caputo, A., Pizzi, S., Pellegrini, M.M. and Dabić, M. (2021), "Digitalization and business models: where are we going? A science map of the field", *Journal of Business Research*, Vol. 123, pp. 489-501, doi: 10.1016/j.jbusres.2020.09.053.

Carayannis, E.G., Dumitrescu, R., Falkowski, T. and Zota, N.-R. (2024), "EmpoweringSMEs 'harnessingthe potential of Gen AI for resilience and competitiveness'", *IEEE Transactions on Engineering Management*, Vol. 71, pp. 14754-14774, doi: 10.1109/TEM.2024.3456820.

Casadesus-Masanell, R. and Zhu, F. (2013), "Business model innovation and competitive imitation: the case of sponsor-based business models", *Strategic Management Journal*, Vol. 34 No. 4, pp. 464-482, doi: 10.1002/smj.2022.

Chit, M.M., Croucher, R. and Rizov, M. (2023), "Surviving the COVID-19 pandemic: the antecedents of success among European SMEs", *European Management Review*, Vol. 20 No. 1, pp. 113-127, doi: 10.1111/emre.12525.

Ciasullo, M.V., Montera, R. and Douglas, A. (2022), "Building SMEs' resilience in times of uncertainty: the role of big data analytics capability and co-innovation", *Transforming*

Government: People, Process and Policy, Vol. 16 No. 2, pp. 203-217, doi: 10.1108/TG-07-2021-0120.

Cong, L.W., Yang, X. and Zhang, X. (2024), "Small and medium enterprises amidst the pandemic and reopening: digital edge and transformation", *Management Science*, Vol. 70 No. 7, pp. 4564-4582, doi: 10.1287/mnsc.2023.02424.

Conz, E. and Magnani, G. (2020), "A dynamic perspective on the resilience of firms: a systematic literature review and a framework for future research", *European Management Journal*, Vol. 38 No. 3, pp. 400-412, doi: 10.1016/j.emj.2019.12.004.

Corvello, V., De Carolis, M., Verteramo, S. and Steiber, A. (2022), "The digital transformation of entrepreneurial work", *International Journal of Entrepreneurial Behaviour and Research*, Vol. 28 No. 5, pp. 1167-1183, doi: 10.1108/IJEBR-01-2021-0067.

Corvello, V., Verteramo, S., Nocella, I. and Ammirato, S. (2023), "Thrive during a crisis: the role of digital technologies in fostering antifragility in small and medium-sized enterprises", *Journal of Ambient Intelligence and Humanized Computing*, Vol. 14 No. 11, pp. 14681-14693, doi: 10.1007/s12652-022-03816-x.

Costa, J. and Castro, R. (2021), "SMEs must go online—E-commerce as an escape hatch for resilience and survivability", *Journal of Theoretical and Applied Electronic Commerce Research*, Vol. 16 No. 7, pp. 3043-3062, doi: 10.3390/jtaer16070166.

Cugno, M., Castagnoli, R., Büchi, G. and Pini, M. (2022), "Industry 4.0 and production recovery in the covid era", *Technovation*, Vol. 114, 102443, doi: 10.1016/j.technovation.2021.102443.

Damiano, R. and Valenza, G. (2025), "Enacting resilience in small and medium enterprises following the sustainability path: a systematic literature review", *Strategic Change*, Vol. 34 No. 2, pp. 237-252, doi: 10.1002/jsc.2608.

Derguech, W., Bhiri, S. and Curry, E. (2017), "Designing business capability-aware configurable process models", *Information Systems*, Vol. 72, pp. 77-94, doi: 10.1016/j.is.2017.10.001.

Dluhopolskyi, O., Pakhnenko, O., Lyeonov, S., Semenog, A., Artyukhova, N., Cholewa-Wiktor, M. and Jastrzębski, W. (2023), "Digital financial inclusion: COVID-19 impacts and opportunities", *Sustainability*, Vol. 15 No. 3, 2383, doi: 10.3390/su15032383.

Duchek, S. (2020), "Organizational resilience: a capability-based conceptualization", *Business research*, Vol. 13 No. 1, pp. 215-246, doi: 10.1007/s40685-019-0085-7.

El Sawy, O.A. and Pavlou, P.A. (2008), "IT-Enabled business capabilities for turbulent environments", *MIS Quarterly Executive*, Vol. 7 No. 3, pp. 139-150.

Eriksson, T., Heikkilä, M. and Nummela, N. (2022), "Business model innovation for resilient international growth", *Small Enterprise Research*, Vol. 29 No. 3, pp. 205-226, doi: 10.1080/13215906.2022.2092890.

Fink, A. (2019), *Conducting Research Literature Reviews: from the Internet to Paper*, SAGE Publications, Los Angeles.

Florez-Jimenez, M.P., Lleo, A., Danvila-del-Valle, I. and Sánchez-Martin, G. (2024), "Corporate sustainability, organizational resilience and corporate purpose: a triple concept for achieving long-term prosperity", *Management Decision*, Vol. 62 No. 7, pp. 2189-2213, doi: 10.1108/MD-06-2023-0938.

Gambirage, C., Cyrino, A.B., da Silva, J., Barbosa, L.G.M. and Parente, R.C. (2023), "Examining entrepreneurial successes and failures during the COVID-19 pandemic (2019-2023)", *Journal of Small Business and Enterprise Development*, Vol. 30 No. 7, pp. 1298-1328, doi: 10.1108/JSBED-03-2022-0152.

Gergely, O., Oborni, K. and Popovic Pantic, S. (2024), "Digitalization as a resilience strategy for women owned SMEs during crises", *Society and Economy*, Vol. 46 No. 4, pp. 386-403, doi: 10.1556/204.2024.00013.

Ghobakhloo, M. and Tang, S.H. (2015), "Information system success among manufacturing SMEs: case of developing countries", *Information Technology for Development*, Vol. 21 No. 4, pp. 573-600, doi: 10.1080/02681102.2014.996201.

González-Albo, B. and Bordons, M. (2011), "Articles vs. proceedings papers: do they differ in research relevance and impact? A case study in the library and information science field", *Journal of Informetrics*, Vol. 5 No. 3, pp. 369-381, doi: 10.1016/j.joi.2011.01.011.

González-Serrano, M.H., Dos Santos, M.A., Sendra-Garcia, J. and Calabuig, F. (2023a), "Sports entrepreneurship during COVID-19: technology as an ally to maintain the competitiveness of small businesses", *Technological Forecasting and Social Change*, Vol. 187, 122256, doi: 10.1016/j.techfore.2022.122256.

González-Serrano, M.H., Valantine, I., Hammerschmidt, J. and Calabuig, F. (2023b), "How to foster intrapreneurial intentions of sport science students? A cross-cultural symmetric and asymmetric approach", *Economic Research-Ekonomska Istraživanja*, Vol. 36 No. 1, 2180059, doi: 10.1080/1331677X.2023.2180059.

Gouveia, S., de la Iglesia, D.H., Abrantes, J.L. and López Rivero, A.J. (2024), "Transforming strategy and value creation through digitalization?", *Administrative Sciences*, Vol. 14 No. 11, p. 307, doi: 10.3390/admsci14110307.

Gregurec, I., Furjan, M.T. and Tomičić-pupek, K. (2021), "The impact of covid 19 on sustainable business models in smes", *Sustainability*, Vol. 13 No. 3, pp. 1-24, doi: 10.3390/su13031098.

Guo, Y., Chen, Y., Usai, A., Wu, L. and Qin, W. (2023), "Knowledge integration for resilience among multinational SMEs amid the COVID-19: from the view of global digital platforms", *Journal of Knowledge Management*, Vol. 27 No. 1, pp. 84-104, doi: 10.1108/JKM-02-2022-0138.

Han, H. and Trimi, S. (2022), "Towards a data science platform for improving SME collaboration through Industry 4.0 technologies", *Technological Forecasting and Social Change*, Vol. 174, 121242, doi: 10.1016/j.techfore.2021.121242.

Hansen, A.K., Christiansen, L. and Lassen, A.H. (2025), "Technology isn't enough for Industry 4.0: on SMEs and hindrances to digital transformation", *International Journal of Production Research*, Vol. 63 No. 18, pp. 6585-6605, doi: 10.1080/00207543.2024.2305800.

Hartmann, S., Backmann, J., Newman, A., Brykman, K.M. and Pidduck, R.J. (2022), "Psychological resilience of entrepreneurs: a review and agenda for future research", *Journal of Small Business Management*, Vol. 60 No. 5, pp. 1041-1079, doi: 10.1080/00472778.2021.2024216.

Hasayotin, K., Maisak, R., Setthajit, R., Ratchatakulpat, T., Naburana, W. and Supanut, A. (2024), "Empowerment of smes and entrepreneurial ecosystems: a qualitative study on diversifying Pattaya'S economy", *Revista de Gestão Social e Ambiental*, Vol. 18 No. 7, pp. 1-30, doi: 10.24857/rgsa.v18n7-070.

He, Q.Y., Dharini Amitha Peiris, K. and Myers, M.D. (2019), "IT governance strategies for SMEs in the fourth industrial revolution", *Proceedings of the 23rd Pacific Asia Conference on Information Systems: Secure ICT Platform for the 4th Industrial Revolution, PACIS 2019. Proceedings, 161*.

Hillmann, J. and Guenther, E. (2021), "Organizational resilience: a valuable construct for management research?", *International Journal of Management Reviews*, Vol. 23 No. 1, pp. 7-44, doi: 10.1111/ijmr.12239.

Holl, A. and Rama, R. (2024), "SME digital transformation and the COVID-19 pandemic: a case study of a hard-hit metropolitan area", *Science and Public Policy*, Vol. 51 No. 6, pp. 1212-1226, doi: 10.1093/scipol/scae023.

Hossain, M.R., Akhter, F. and Sultana, M.M. (2022), "SMEs in covid-19 crisis and combating strategies: a systematic literature review (SLR) and A case from emerging economy", *Operations research perspectives*, Vol. 9, 100222, doi: 10.1016/j.orp.2022.100222.

Hrivnák, M., Moritz, P. and Chreneková, M. (2021), "What kept the boat afloat? Sustainability of employment in knowledge-intensive sectors due to government measures during COVID-19 pandemic", *Sustainability*, Vol. 13 No. 15, 8441, doi: 10.3390/su13158441.

Hu, M.K. and Kee, D.M.H. (2022), "Fostering sustainability: reinventing SME strategy in the new normal", *Foresight*, Vol. 24 Nos 3-4, pp. 301-318, doi: 10.1108/FS-03-2021-0080.

Iancu, A., Popescu, L., Varzaru, A.A. and Avram, C.D. (2022), "Impact of Covid-19 crisis and resilience of small and medium enterprises. Evidence from Romania", *Eastern European Economics*, Vol. 60 No. 4, pp. 352-374, doi: 10.1080/00128775.2022.2032177.

Ibidunni, A.S., William, A., Ayeni, A., Ogundana, O.M., Otokiti, B. and Mohalajeng, L. (2022), "Survival during times of disruptions: rethinking strategies for enabling business viability in the developing economy", *Sustainability*, Vol. 14 No. 20, 13549, doi: 10.3390/su142013549.

Ibikunle, A.K., Rajemi, M.F., Mohd Zahari, F., Faqera, A.F.O. and Ali, G.A. (2025), "Factors hindering lean manufacturing and Six Sigma implementation within manufacturing SMEs: Prisma-Based approach for future research directions", *Journal of Asia Business Studies*, Vol. 19 No. 2, pp. 511-526, doi: 10.1108/JABS-09-2024-0542.

Isensee, C., Teuteberg, F. and Griese, K.M. (2023), "Success factors of organizational resilience: a qualitative investigation of four types of sustainable digital entrepreneurs", *Management Decision*, Vol. 61 No. 5, pp. 1244-1273, doi: 10.1108/MD-03-2022-0326.

Jia, X., Chowdhury, M., Prayag, G. and Chowdhury, M.M.H. (2020), "The role of social capital on proactive and reactive resilience of organizations post-disaster", *International Journal of Disaster Risk Reduction*, Vol. 48, 101614, doi: 10.1016/j.ijdrr.2020.101614.

Jin, L. and Liu, M. (2025), "Unlocking financial opportunities: the substantial alleviation of financing constraints on small and micro enterprises through digital inclusive finance", *Journal of the Knowledge Economy*, Vol. 16 No. 1, pp. 2283-2309, doi: 10.1007/s13132-024-01863-7.

Joseph, N., Totawar, A.K. and Sam, O. (2022), "Fostering resilience through the culture of excellence (CoE) practices: explorative insights from a talent management SME", *Measuring Business Excellence*, Vol. 26 No. 2, pp. 163-179, doi: 10.1108/MBE-06-2021-0082.

Kala Kamdjoug, J.R. (2024), "Change management and digital transformation project success in SMEs located in the Democratic Republic of the Congo", *Journal of Enterprise Information Management*, Vol. 37 No. 2, pp. 580-605, doi: 10.1108/JEIM-09-2022-0340.

Kamalahmadi, M. and Parast, M.M. (2016), "A review of the literature on the principles of enterprise and supply chain resilience: major findings and directions for future research", *International Journal of Production Economics*, Vol. 171, pp. 116-133, doi: 10.1016/j.ijpe.2015.10.023.

Khalil, A., Abdelli, M.E.A. and Mogaji, E. (2022), "Do digital technologies influence the relationship between the COVID-19 crisis and SMEs' resilience in developing countries?", *Journal of Open Innovation: Technology, Market, and Complexity*, Vol. 8 No. 2, p. 100, doi: 10.3390/joitmc8020100.

Khurana, I., Dutta, D.K. and 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*, Vol. 150, pp. 623-641, doi: 10.1016/j.jbusres.2022.06.048.

Klein, V.B. and Todesco, J.L. (2021), "COVID-19 crisis and SMEs responses: the role of digital transformation", *Knowledge and Process Management*, Vol. 28 No. 2, pp. 117-133, doi: 10.1002/kpm.1660.

Koporcic, N., Kukkamalla, P.K., Markovic, S. and Maran, T. (2025), "Resilience of small and medium-sized enterprises in times of crisis: an umbrella review", *Review of Managerial Science*, Vol. 20, pp. 1-29, doi: 10.1007/s11846-025-00883-0.

Kumar, R., Dutta, G. and Phanden, R.K. (2024a), "Digitalization adoption barriers in the context of sustainability and operational excellence: implications for SMEs", *Engineering Management Journal*, Vol. 37 No. 4, pp. 355-371, doi: 10.1080/10429247.2024.2372519.

Kumar, V., Sindhwani, R., Behl, A., Kaur, A. and Pereira, V. (2024b), "Modelling and analysing the enablers of digital resilience for small and medium enterprises", *Journal of Enterprise Information Management*, Vol. 37 No. 5, pp. 1677-1708, doi: 10.1108/jeim-01-2023-0002.

Lathabhavan, R. and Kuppusamy, T. (2024), "Examining the role of digital leadership and organisational resilience on the performance of SMEs during the COVID-19 pandemic", *International Journal of Productivity and Performance Management*, Vol. 73 No. 8, pp. 2365-2384, doi: 10.1108/IJPPM-02-2023-0069.

Lengnick-Hall, C.A., Beck, T.E. and Lengnick-Hall, M.L. (2011), "Developing a capacity for organizational resilience through strategic human resource management", *Human Resource Management Review*, Vol. 21 No. 3, pp. 243-255, doi: 10.1016/j.hrmr.2010.07.001.

Leonelli, S., Campagnolo, D. and Gianecchini, M. (2025), "Entrepreneur and organizational resilience: a multilevel perspective on Italian SMEs", *Journal of Small Business Management*, Vol. 63 No. 2, pp. 757-785, doi: 10.1080/00472778.2024.2351483.

Leppäaho, T. and Ritala, P. (2022), "Surviving the coronavirus pandemic and beyond: unlocking family firms' innovation potential across crises", *Journal of Family Business Strategy*, Vol. 13 No. 1, 100440, doi: 10.1016/j.jfbs.2021.100440.

Liberati, A., Altman, D.G., Tetzlaff, J., Mulrow, C., Gøtzsche, P.C., Ioannidis, J.P., Clarke, M., Devereaux, P.J., Kleijnen, J. and Moher, D. (2009), "The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate healthcare interventions: explanation and elaboration", *BMJ*, Vol. 339 No. jul21 1, b2700, doi: 10.1136/bmj.b2700.

Liñán, F. and Fayolle, A. (2015), "A systematic literature review on entrepreneurial intentions: citation, thematic analyses, and research agenda", *The International Entrepreneurship and Management Journal*, Vol. 11 No. 4, pp. 907-933, doi: 10.1007/s11365-015-0356-5.

Lucas, P.J., Baird, J., Arai, L., Law, C. and Roberts, H.M. (2007), "Worked examples of alternative methods for the synthesis of qualitative and quantitative research in systematic reviews", *BMC Medical Research Methodology*, Vol. 7 No. 1, p. 4, doi: 10.1186/1471-2288-7-4.

Mallinson, D.J., Morçöl, G., Yoo, E., Azim, S.F., Levine, E. and Shafi, S. (2020), "Sharing economy: a systematic thematic analysis of the literature", *Information Polity*, Vol. 25 No. 2, pp. 143-158, doi: 10.3233/IP-190190.

Marchese, S., Gastaldi, L. and Corso, M. (2025), "Thriving in turbulent environments through adaptive forms of organizing", *Management Decision*, Vol. 63 No. 6, pp. 2038-2060, doi: 10.1108/MD-05-2022-0655.

Marrucci, A., Rialti, R. and Balzano, M. (2025), "Exploring paths underlying Industry 4.0 implementation in manufacturing SMEs: a fuzzy-set qualitative comparative analysis", *Management Decision*, Vol. 63 No. 6, pp. 1936-1959, doi: 10.1108/MD-05-2022-0644.

Meyer, A.D. (1982), "Adapting to environmental jolts", *Administrative Science Quarterly*, Vol. 27 No. 4, pp. 515-537, doi: 10.2307/2392528.

Mladenova, I. (2024), "SMEs in a digital era: the role of management", *Administrative Sciences*, Vol. 14 No. 11, p. 296, doi: 10.3390/admsci14110296.

Moher, D., Liberati, A., Tetzlaff, J. and Altman, D.G. (2009), "Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement", *PLoS Medicine*, Vol. 6 No. 7, e1000097, doi: 10.1371/journal.pmed.1000097.

Morris, J., Morris, W. and Bowen, R. (2022), "Implications of the digital divide on rural SME resilience", *Journal of Rural Studies*, Vol. 89, pp. 369-377, doi: 10.1016/j.jrurstud.2022.01.005.

Mousa, M., Abdelgaffar, H.A., Chaouali, W. and Aboramadan, M. (2020), "Organizational learning, organizational resilience and the mediating role of multi-stakeholder networks: a study of Egyptian academics", *Journal of Workplace Learning*, Vol. 32 No. 3, pp. 161-181, doi: 10.1108/JWL-05-2019-0057.

Msomi, T.S. and Ntuli, L.S. (2024), "Evaluating the relationship between digital transformation and resilience of small and medium enterprises in the Post-Covid-19 era in South Africa", *African Journal of Business and Economic Research*, Vol. 19 No. 3, p. 501, doi: 10.31920/1750-4562/2024/v19n3a23.

Nan, W. and Park, M. (2022), "Improving the resilience of SMEs in times of crisis: the impact of mobile money amid Covid-19 in Zambia", *Journal of International Development*, Vol. 34 No. 4, pp. 697-714, doi: 10.1002/jid.3596.

Obiri-Yeboah, H., Tetteh, F.K., Amoako, D.K. and Kyeremeh, A. (2025), "Navigating digital transformation: a practice-based view of supply chain resilience and viability in small and medium enterprises", *Journal of Enterprising Communities: People and Places in the Global Economy*, Vol. 19 No. 4, pp. 816-852, doi: 10.1108/JEC-12-2024-0249.

OECD (2016), *Entrepreneurship at a Glance 2016*, OECD Publishing, Paris, doi: 10.1787/entrepreneur_aag-2016-en.

Ogrean, C. and Herciu, M. (2021), "Romania's SMEs on the way to EUs twin transition to digitalization and sustainability", *Studies in Business and Economics*, Vol. 16 No. 2, pp. 282-295, doi: 10.2478/sbe-2021-0040.

Okoli, C. (2015), "A guide to conducting a standalone systematic literature review", *Communications of the Association for Information Systems*, Vol. 37 No. 1, pp. 879-910, doi: 10.17705/1cais.03743.

Őri, D., Szabó, I., Kő, A. and Kovács, T. (2024), "Digitalizing in crisis: the role of organizational resilience in SMEs' digitalization", *Journal of Enterprise Information Management*, Vol. 37 No. 4, pp. 1185-1205, doi: 10.1108/JEIM-03-2023-0141.

Page, M.J., McKenzie, J.E., Bossuyt, P.M., Boutron, I., Hoffmann, T.C., Mulrow, C.D., Shamseer, L., Tetzlaff, J.M., Akl, E.A., Brennan, S.E., Chou, R., Glanville, J., Grimshaw, J.M., Hróbjartsson, A., Lalu, M.M., Li, T., Loder, E.W., Mayo-Wilson, E., McDonald, S., McGuinness, L.A., Stewart, L.A., Thomas, J., Tricco, A.C., Welch, V.A., Whiting, P. and Moher, D. (2021), "The PRISMA 2020 statement: an updated guideline for reporting systematic reviews", *BMJ*, Vol. 372, n71, doi: 10.1136/bmj.n71.

Patel, S.S., Rogers, M.B., Amlôt, R. and Rubin, G.J. (2017), "What do we mean by 'community resilience'? A systematic literature review of how it is defined in the literature", *PLoS Currents*, Vol. 9, doi: 10.1371/currents.dis.db775aff25efc5ac4f0660ad9c9f7db2.

Pelletier, C. and Cloutier, L.M. (2019), "Conceptualising digital transformation in SMEs: an ecosystemic perspective", *Journal of Small Business and Enterprise Development*, Vol. 26 Nos 6-7, pp. 855-876, doi: 10.1108/JSBED-05-2019-0144.

Powell, E.E. (2011), *Weathering the Gale: Toward a Theory of Entrepreneurial Resourcefulness and Resilience*, North Carolina State University, North Carolina.

Rader, D. (2019), "Digital maturity–the new competitive goal", *Strategy and Leadership*, Vol. 47 No. 5, pp. 28-35, doi: 10.1108/SL-06-2019-0084.

Radzi, N.R., Tajuddin, S.N.A.A. and Bahari, K.A. (2024), "Small steps, big security: TAM-powered insights of cybersecurity adoption among small-and-medium entrepreneurs in digital business", *Journal of Ecohumanism*, Vol. 3 No. 3, pp. 1626-1638, doi: 10.62754/joe.v3i3.3327.

Rahnama, H., Johansen, K., Larsson, L. and Rönnbäck, A.Ö. (2022), "Collaboration in value constellations for sustainable production: the perspective of small technology solution providers", *Sustainability*, Vol. 14 No. 8, 4794, doi: 10.3390/su14084794.

Ramadan, M., Zakhem, N.B., Baydoun, H., Daouk, A., Youssef, S., El Fawal, A., Elia, J. and Ashaal, A. (2023), "Toward digital transformation and business model innovation: the nexus between leadership, organizational agility, and knowledge transfer", *Administrative Sciences*, Vol. 13 No. 8, p. 185, doi: 10.3390/admsci13080185.

Rashid, Y., Waseem, A., Akbar, A.A. and Azam, F. (2019), "Value co-creation and social media: a systematic literature review using citation and thematic analysis", *European Business Review*, Vol. 31 No. 5, pp. 761-784, doi: 10.1108/EBR-05-2018-0106.

Razavi Hajiagha, S.H., Alaei, S., Sadraee, A. and Nazmi, P. (2024), "A perspective of international performance improvement concentrating on innovation and digital resilience of SMEs: the case of an emerging economy", *Journal of Enterprise Information Management*, Vol. 37 No. 5, pp. 1709-1736, doi: 10.1108/JEIM-02-2023-0078.

Robertson, J., Botha, E., Walker, B., Wordsworth, R. and Balzarova, M. (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 and Distribution Management*, Vol. 50 Nos 8-9, pp. 1182-1204, doi: 10.1108/IJRDM-10-2021-0514.

Rodrigues, M., Franco, M., Sousa, N. and Silva, R. (2021), "COVID 19 and the business management crisis: an empirical study in SMEs", *Sustainability*, Vol. 13 No. 11, pp. 1-20, doi: 10.3390/su13115912.

Roman, A. and Rusu, V.D. (2022), "Digital technologies and the performance of small and medium enterprises", *Studies in Business and Economics*, Vol. 17 No. 3, pp. 190-203, doi: 10.2478/sbe-2022-0055.

Sagala, G.H. and Őri, D. (2025a), "Antifragility, resilience and collaborative networks of SMEs: a theoretical foundation", *European Journal of Innovation Management*, Vol. 28 No. 8, pp. 3464-3489, doi: 10.1108/EJIM-09-2023-0797.

Sagala, G.H. and Őri, D. (2025b), "Exploring digital transformation strategy to achieve SMEs resilience and antifragility: a systematic literature review", *Journal of Small Business and Entrepreneurship*, Vol. 37 No. 3, pp. 495-524, doi: 10.1080/08276331.2024.2392080.

Sahoo, P., Saraf, P.K. and Uchil, R. (2024), "Identification of critical success factors for leveraging Industry 4.0 technology and research agenda: a systematic literature review using PRISMA protocol", *Asia-Pacific Journal of Business Administration*, Vol. 16 No. 3, pp. 457-481, doi: 10.1108/APJBA-03-2022-0105.

Saka, T.N., Hormiga, E. and Valls-Pasola, J. (2025), "Crisis response strategies: a digital reluctance perspective", *Review of Managerial Science*, Vol. 19 No. 8, pp. 2569-2607, doi: 10.1007/s11846-024-00822-5.

Saleem, I., Hoque, S.M.S., Tashfeen, R. and Weller, M. (2023), "The interplay of AI adoption, IoT edge, and adaptive resilience to explain digital innovation: evidence from German family-owned SMEs", *Journal of Theoretical and Applied Electronic Commerce Research*, Vol. 18 No. 3, pp. 1419-1430, doi: 10.3390/jtaer18030071.

Satpathy, A.S., kumar Sahoo, S., Mohanty, A. and Mohanty, P.P. (2025), "Strategies for enhancements of MSME resilience and sustainability in the post-COVID-19 era", *Social Sciences and Humanities Open*, Vol. 11, 101223, doi: 10.1016/j.ssaho.2024.101223.

Senin, S.M., Juhdi, N.H., Omar, A.R.C. and Hashim, N.A. (2024), "A systematic review of adaptation of IR 4.0 during COVID-19 pandemic among global SMEs", *Journal of Logistics, Informatics and Service Science*, Vol. 11 No. 2, pp. 61-83, doi: 10.33168/JLISS.2024.0205.

Sharma, G.D., Kraus, S., Talan, A., Srivastava, M. and Theodoraki, C. (2024), "Navigating the storm: the SME way of tackling the pandemic crisis", *Small Business Economics*, Vol. 63 No. 1, pp. 221-241, doi: 10.1007/s11187-023-00810-1.

Sheffi, Y. and Rice, J.B. Jr (2005), "A supply chain view of the resilient enterprise", *MIT Sloan Management Review*.

Sheresheva, M., Efremova, M., Valitova, L., Polukhina, A. and Laptev, G. (2021), "Russian tourism enterprises' marketing innovations to meet the COVID-19 challenges", *Sustainability*, Vol. 13 No. 7, 3756, doi: 10.3390/su13073756.

Silva, E., Beirão, G. and Torres, A. (2023), "How startups and entrepreneurs survived in times of pandemic crisis: implications and challenges for managing uncertainty", *Journal of Small Business Strategy*, Vol. 33 No. 1, pp. 84-97, doi: 10.53703/001c.72084.

Sinha, K.K., Raby, S. and Salari, T. (2024), "Exploring the scope and depth of digitalisation in times of crisis: implications for SME resilience", *International Small Business Journal*, Vol. 43 No. 3, pp. 219-245, doi: 10.1177/02662426241293000.

Smith, J.B., Smith, C.G., Kietzmann, J. and Lord Ferguson, S.T. (2022), "Understanding micro-level resilience enactment of everyday entrepreneurs under threat", *Journal of Small Business Management*, Vol. 60 No. 5, pp. 1202-1245, doi: 10.1080/00472778.2021.2017443.

Soomro, M.A. and Khan, A.N. (2024), "Reimagining resilience: visionary leadership, digital transformation, and strategic flexibility in small and medium enterprises in construction sector", *IEEE Transactions on Engineering Management*, Vol. 71, pp. 15070-15083, doi: 10.1109/TEM.2024.3477629.

Spremic, M., Zentner, H. and Zentner, R. (2024), "Measuring digital business models maturity: theory, framework, and empirical validation", *IEEE Transactions on Engineering Management*, Vol. 71, pp. 6553-6567, doi: 10.1109/TEM.2022.3226864.

Storey, D.J. (2016), *Understanding the Small Business Sector*, Routledge, New York.

Straková, J., Talíř, M. and Váchal, J. (2022), "Opportunities and threats of digital transformation of business models in smes", *Economics and Sociology*, Vol. 15 No. 3, pp. 159-171, doi: 10.14254/2071-789X.2022/15-3/9.

Su, W. and Junge, S. (2023), "Unlocking the recipe for organizational resilience: a review and future research directions", *European Management Journal*, Vol. 41 No. 6, pp. 1086-1105, doi: 10.1016/j.emj.2023.03.002.

Sulastri, S., Mulyadi, H., Disman, D., Hendrayati, H. and Purnomo, H. (2023), "Resilience acceleration model of small and medium enterprises through digital transformation", *Journal of Eastern European and Central Asian Research*, Vol. 10 No. 4, pp. 609-619, doi: 10.15549/jeecar.v10i4.1355.

Sullivan-Taylor, B. and Branicki, L. (2011), "Creating resilient SMEs: why one size might not fit all", *International Journal of Production Research*, Vol. 49 No. 18, pp. 5565-5579, doi: 10.1080/00207543.2011.563837.

Teece, D.J. (2007), "Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance", *Strategic Management Journal*, Vol. 28 No. 13, pp. 1319-1350, doi: 10.1002/smj.640.

Teece, D., Peteraf, M. and Leih, S. (2016), "Dynamic capabilities and organizational agility: risk, uncertainty, and strategy in the innovation economy", *California Management Review*, Vol. 58 No. 4, pp. 13-35, doi: 10.1525/cmr.2016.58.4.13.

Teece, D.J., Pisano, G. and Shuen, A. (1997), "Dynamic capabilities and strategic management", *Strategic Management Journal*, Vol. 18 No. 7, pp. 509-533, doi: 10.1002/(sici)1097-0266(199708)18:7<509::aid-smj882>3.0.co;2-z.

Tranfield, D., Denyer, D. and Smart, P. (2003), "Towards a methodology for developing evidence-informed management knowledge by means of systematic review", *British Journal of Management*, Vol. 14 No. 3, pp. 207-222, doi: 10.1111/1467-8551.00375.

Trieu, H.D.X., Nguyen, P.V., Tran, K.T., Vrontis, D. and Ahmed, Z. (2023), "Organisational resilience, ambidexterity and performance: the roles of information technology competencies, digital transformation policies and paradoxical leadership", *International Journal of Organizational Analysis*, Vol. 32 No. 7, pp. 1302-1321, doi: 10.1108/IJOA-05-2023-3750.

Vasi, M., Sansone, G. and English, V. (2024), "Exogenous crises and smes resilience: the dynamic open innovation funnel", *Technovation*, Vol. 129, 102886, doi: 10.1016/j.technovation.2023.102886.

Velu, S.R., Al Mamun, A., Kanesan, T., Hayat, N. and Gopinathan, S. (2019), "Effect of information system artifacts on organizational resilience: a study among Malaysian SMEs", *Sustainability*, Vol. 11 No. 11, pp. 1-23, doi: 10.3390/su11113177.

Verhoef, P.C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Dong, J.Q., Fabian, N. and Haenlein, M. (2021), "Digital transformation: a multidisciplinary reflection and research agenda", *Journal of Business Research*, Vol. 122, pp. 889-901, doi: 10.1016/j.jbusres.2019.09.022.

Walters, T. (2016), "Using thematic analysis in tourism research", *Tourism Analysis*, Vol. 21 No. 1, pp. 107-116, doi: 10.3727/108354216X14537459509017.

Wang, X. and Sun, M. (2025a), "Enhancing SMEs resilience through digital innovation: a stage-based analysis", *European Journal of Innovation Management*, Vol. 28 No. 6, pp. 2607-2629, doi: 10.1108/EJIM-09-2023-0800.

Wang, X. and Sun, M. (2025b), "How does digital innovation synergy improve the organisational resilience of 'specialized, refined, differentiated, and innovative'SMEs?", *Technology Analysis and Strategic Management*, Vol. 37 No. 12, pp. 3021-3035, doi: 10.1080/09537325.2024.2389147.

Wang, K., Pellegrini, M.M., Xue, K., Wang, C. and Peng, M. (2024), "Digital resilience in the internationalization of small and medium companies: how does it work?", *Journal of Enterprise Information Management*, Vol. 37 No. 5, pp. 1458-1478, doi: 10.1108/JEIM-02-2023-0100.

Ward, V., House, A. and Hamer, S. (2009), "Developing a framework for transferring knowledge into action: a thematic analysis of the literature", *Journal of Health Services Research and Policy*, Vol. 14 No. 3, pp. 156-164, doi: 10.1258/jhsrp.2009.008120.

Waty, E., So, I.G., Indrajit, R.E. and Abdinagoro, S.B. (2023), "Digital innovation, agility, and the government intervention in the culinary sector small and medium enterprises: business resilience

in Indonesia after turbulence", *International Journal of eBusiness and eGovernment Studies*, Vol. 15 No. 1, pp. 103-133.

Webster, J. and Watson, R.T. (2002), "Analyzing the past to prepare for the future: writing a literature review", *MIS Quarterly*, Vol. 26 No. 2, pp. xiii-xxiii.

WEF (2021), "Future readiness of SMEs: mobilizing the SME sector to drive widespread sustainability and prosperity", White Paper, November, pp. 1-43.

WEF (2022), *Future Readiness of Smes and Mid-sized Companies: A Year on - INSIGHT REPORT, NOVEMBER 2022*, World Economic Forum, Geneva.

Westerlund, M. (2020), "Digitalization, internationalization and scaling of online SMEs", *Technology Innovation Management Review*, Vol. 10 No. 4, pp. 48-57, doi: 10.22215/timreview/1346.

Widiatmaka, F.P., Kensiwi, F., Suharso, D.D., Cahya, S.K., Listyorini, H. and Supriyanto, S. and others (2024), "Resilience in tourism-based SMEs driven by initiatives and strategies through share value relational capital viewed from a resource-based theory perspective", *Humanities and Social Sciences Communications*, Vol. 11 No. 1, pp. 1-16, doi: 10.1057/s41599-024-03607-z.

Xie, Y., Xia, Q., Song, J. and Hu, S. (2024), "Can sustainability orientation make firms more resilient? Exploring the role of digital business model innovation, digital orientation, and environmental dynamism", *Sustainable Development*, Vol. 33 No. 1, pp. 364-378, doi: 10.1002/sd.3125.

Xu, B., Li, J. and Wu, Y. (2024), "External shock, stimulus policy and economic resilience of small and micro businesses: evidence from COVID-19 pandemic in China", *Asia-Pacific Journal of Regional Science*, Vol. 8 No. 2, pp. 585-613, doi: 10.1007/s41685-024-00339-5.

Yao, Y. and Fabbe-Costes, N. (2018), "Can you measure resilience if you are unable to define it? The analysis of supply network resilience (SNRES)", *Supply Chain Forum*, Vol. 19 No. 4, pp. 255-265, doi: 10.1080/16258312.2018.1540248.

Zirar, A., Jabbar, A., Njoya, E. and Amoozad Mahdiraji, H. (2024), "Smart contract challenges and drawbacks for SME digital resilience", *Journal of Enterprise Information Management*, Vol. 37 No. 5, pp. 1527-1550, doi: 10.1108/JEIM-02-2023-0082.

Further reading

Brito, R.P.D., Lenz, A.K. and Pacheco, M.G.M. (2022), "Resilience building among small businesses in low-income neighborhoods", *Journal of Small Business Management*, Vol. 60 No. 5, pp. 1166-1201, doi: 10.1080/00472778.2022.2041197.

Demmer, W.A., Vickery, S.K. and Calantone, R. (2011), "Engendering resilience in small-and medium-sized enterprises (SMEs): a case study of demmer corporation", *International Journal of Production Research*, Vol. 49 No. 18, pp. 5395-5413, doi: 10.1080/00207543.2011.563903.

Devos, J., Van Landeghem, H. and Deschoolmeester, D. (2012), "Theoretical foundations for information systems success in small- and medium-sized enterprises", in *Measuring Organizational Information Systems Success: New Technologies and Practices*, pp. 80-100. doi: 10.4018/978-1-4666-0170-3.ch005.

Ed-Dafali, S., Adardour, Z., Derj, A., Bami, A. and Hussainey, K. (2025), "A PRISMA-Based systematic review on economic, social, and governance practices: insights and research agenda", *Business Strategy and the Environment*, Vol. 34 No. 2, pp. 1896-1916, doi: 10.1002/bse.4069.

Iborra, M., Safón, V. and Dolz, C. (2022), "Does ambidexterity consistency benefit small and medium-sized enterprises' resilience?", *Journal of Small Business Management*, Vol. 60 No. 5, pp. 1122-1165, doi: 10.1080/00472778.2021.2014508.

Masouras, A., Pistikou, V. and Komodromos, M. (2021), "Innovation analysis in cypriot small and medium-sized enterprises and the role of the european union", in *Entrepreneurship, Institutional Framework and Support Mechanisms in the EU*, Emerald Publishing, pp. 115-131, doi: 10.1108/978-1-83909-982-320211011.

Roffia, P. and Dabić, M. (2024), "The role of management control and integrated information systems for the resilience of SMEs", *Review of Managerial Science*, Vol. 18 No. 5, pp. 1353-1375, doi: 10.1007/s11846-023-00657-6.

Von Briel, F., Davidsson, P. and Recker, J. (2018), "Digital technologies as external enablers of new venture creation in the IT hardware sector", *Entrepreneurship Theory and Practice*, Vol. 42 No. 1, pp. 47-69, doi: 10.1177/1042258717732779.

Corresponding author
Gaffar Hafiz Sagala can be contacted at: gaffar.sagala@stud.uni-corvinus.hu