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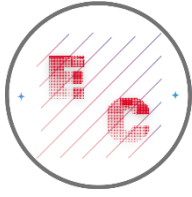
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**DIGITAL TRANSFORMATION AS A CATALYST FOR ORGANIZATIONAL AGILITY
AND BUSINESS RESILIENCE IN THE POST-PANDEMIC CONTEXT**

**LA TRANSFORMACIÓN DIGITAL COMO CATALIZADOR DE LA AGILIDAD
ORGANIZACIONAL Y LA RESILIENCIA EMPRESARIAL EN EL CONTEXTO
POSTPANDEMIA**

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Digital transformation as a catalyst for organizational agility and business resilience in the post-pandemic context

La transformación digital como catalizador de la agilidad organizacional y la resiliencia empresarial en el contexto postpandemia

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RESUMEN

El entorno postpandemia, caracterizado por la volatilidad, incertidumbre, complejidad y ambigüedad (VUCA), exige agilidad organizacional (AO) y resiliencia empresarial (RE) como condiciones críticas de supervivencia. La transformación digital (TD) se reconoce como catalizador fundamental, aunque la literatura carece de un análisis sistemático sobre su impacto en AO y RE. Este estudio desarrolla una revisión sistemática de la literatura (354 artículos de Scopus y Web of Science, 2018–2026) para explorar: (i) la relación entre TD, AO y RE; (ii) los impulsores de la agilidad; (iii) el papel de la AO digitalizada en la resiliencia; y (iv)

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barreras, facilitadores y factores contextuales. Los resultados confirman el efecto positivo de la TD sobre la RE, mediado por innovación y respuesta ágil, con marcos como RBV, DCT, IPT, SCT e Industria 4.0. El estudio aporta implicaciones teóricas y prácticas para estrategias digitales que fortalezcan la AO y la RE en entornos disruptivos.

Palabras clave: transformación digital (TD); agilidad organizacional (AO); resiliencia empresarial (RE); entorno VUCA; capacidades dinámicas

ABSTRACT

The post-pandemic VUCA environment demands organizational agility (OA) and business resilience (BR). Digital transformation (DT) is recognized as a key catalyst, yet systematic analyses of its effects on OA and BR and the factors moderating this relationship remain scarce. This systematic literature review of 354 articles (Scopus and Web of Science, 2018–2026) investigates: (i) links among DT, OA and BR; (ii) drivers of agility; (iii) how digitalized OA fosters resilience; and (iv) barriers, enablers and contextual moderators. Findings show a positive effect of DT on BR, mediated by innovation and agile response. The relationships are supported by theoretical lenses (RBV, DCT, IPT, SCT) and models such as EFQM 2025 and Industry 4.0. Identified barriers include resistance to change and organizational culture; enablers include leadership and dynamic capabilities. Firm size and digital maturity act as key moderators. Implications are offered for DT strategies to strengthen OA and BR.

Keywords: digital transformation; organizational agility; business resilience; VUCA environment; dynamic capabilities

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INTRODUCTION

The current business environment is defined by volatility, uncertainty, complexity, and ambiguity (VUCA), exacerbated by global disruptive events such as the COVID-19 pandemic and geopolitical conflicts (Ashkanasy et al., 2025; Pennetta, 2025; Syamsir et al., 2025; Ramírez-Soto et al., 2024). In this context, digital transformation (DT) has become an indispensable strategy for organizations not only to survive but also to thrive (Berawi et al., 2020; Li et al., 2022). DT involves the integration of digital technologies across all aspects of business, fundamentally altering how firms operate and deliver value to their customers (Nugraha et al., 2025; Assal, 2024).

In parallel, organizational agility (OA) and business resilience (BR) have emerged as critical capabilities for adapting quickly to changes and effectively recovering from adversity (Zhang et al., 2025). OA refers to an organization's ability to sense and respond rapidly to market changes (Aljawazneh, 2024). BR, in turn, denotes the capacity to withstand and recover from disruptions, and even adapt or transform in their aftermath (Ivanov, 2022).

The interconnection among these three constructs is increasingly evident. DT is not merely a technological trend but a fundamental catalyst for agility and resilience, enabling firms to reinvent their operations, strategies, and business models (Sagala & Őri, 2025). However, DT's benefits are contingent on moderating factors—organizational culture, leadership, and resource availability—that can enable or constrain successful implementation (Castillo et al., 2025; Korobkina & Dashenkova, 2025).

Despite growing interest, significant gaps remain in the comprehensive understanding of how DT influences OA and BR—both configurationally and through mediation—particularly in the context of recent global disruptions. Therefore, this study synthesizes recent evidence to provide a holistic perspective on these interactions.

This systematic literature review addresses the following research questions (RQs):

- RQ1: What is the conceptual and empirical relationship between digital transformation, organizational agility, and business resilience as discussed in recent academic literature?
- RQ2: What frameworks, models, and specific practices of digital transformation are identified in the literature as the main drivers of organizational agility?
- RQ3: How does organizational agility, facilitated by digitalization, translate into greater business resilience in the face of external disruptions (economic, health-related, geopolitical)?
- RQ4: What barriers, enablers, and contextual factors (e.g., organizational culture, leadership, firm size) moderate the effectiveness of digital transformation in enhancing agility and resilience?

The paper is structured as follows: Section 2 presents the theoretical foundation underpinning the study. Section 3 details the methodology of the systematic review. Section 4 reports the findings, organized according to the research questions. Finally, Section 5 outlines the conclusions, implications, study limitations, and future research directions.

Theoretical foundation

This research integrates perspectives from strategic management, information systems, and organizational behavior to explain the interconnection between digital transformation (DT), organizational agility (OA), and business resilience (BR) in the post-pandemic context. The framework builds on the Resource-Based View (RBV), Dynamic Capabilities Theory (DCT), Information Processing Theory (IPT), Social Cognitive Theory (SCT), and Diffusion of Innovation Theory (DOI), complemented by management models (EFQM 2025, digital maturity) and contemporary concepts (IS ambidexterity, Industry 4.0/5.0) (Cosa & Torelli, 2024; Chavarnakul et al., 2025; Gallego Cossio et al., 2025; Syamsir et al., 2025).

Resource-Based View (RBV) and Dynamic Capabilities Theory (DCT)

The Resource-Based View (RBV) is a central theory explaining how organizations achieve sustainable competitive advantages through the accumulation and deployment of

valuable, rare, inimitable, and non-substitutable resources (Barney, 1991; Hall, 1993; Grant, 1991; Wernerfelt, 1984, 1995 as cited in Siddique et al., 2025; Zhang et al., 2025; Ahmed et al., 2025). In information systems, RBV highlights resources such as updated information quality, staff skills, and executives' innovativeness as fundamental for organizational success (Wade & Hulland, 2004 as cited in Siddique et al., 2025; Berawi et al., 2020; Li et al., 2022). Accordingly, RBV suggests that organizations can secure competitive advantage by cultivating distinctive resources that enable adaptation to rapidly evolving digital environments (Gallego Cossio et al., 2025; Rizana et al., 2024; Sagala & Őri, 2025).

Complementarily, Dynamic Capabilities Theory (DCT) explaining how firms transform digital resources into resilience and antifragility by integrating, building, and reconfiguring competencies in fast-changing environments (Sagala & Őri, 2025; Ivanov, 2022). Key microfoundations include IS-ambidexterity—simultaneous exploration and exploitation of information systems—recognized as critical for agility (Siddique et al., 2025). Kwiotkowska (2024) further identifies three core dynamic capabilities: sensing, seizing, and reconfiguring, all of which are essential for organizational resilience, particularly in capital-intensive firms.

In this study, RBV explains how digital resources enable OA, while DCT clarifies how these dynamic capabilities allow OA to translate into BR under disruptive contexts.

Information Processing Theory (IPT)

Information Processing Theory (IPT) argues that digital infrastructures (e.g., digital supply chains) increase firms' information-processing capacity, improving decision speed and quality and thus operational efficiency (Joshi & Sharma, 2022; Li et al., 2022; Ivanov, 2022). This framework supports the DT → OA pathway, showing how digitalized information enhances decision-making speed and quality—an essential condition for OA to foster BR.

Social Cognitive Theory (SCT)

To capture broader aspects of organizational resilience—beyond resources and structure, incorporating cognitive processes and social interactions of managers and

employees—this study draws on Social Cognitive Theory (SCT) (Zhang et al., 2025; Nolte & Lindenmeier, 2024). explains how cognitive and social processes—self-efficacy, emotional regulation, and manager–employee interactions—shape organizational resilience, linking human factors to the DT → OA → BR causal chain (Pennetta, 2025).

Diffusion of Innovation Theory (DOI)

Diffusion of Innovation Theory (DOI) explains how innovation adoption spreads in social systems, shaping digital competence and learning essential for agility and resilience (Starke & Ludviga, 2025; Robinson, 2009; Berawi et al., 2020; Li et al., 2022; Del Giudice et al., 2021).

From this perspective, DOI justifies differences in DT effectiveness based on adoption levels, moderating the DT → OA pathway and its impact on BR (Piprani et al., 2024).

Key Management Models and Frameworks 140

- **EFQM 2025 Model:** A structured framework emphasizing disruption management, business continuity, and data-driven insights, integrating sustainability and technologies like AI and Big Data, while highlighting agility, organizational resilience, and new work forms such as remote, hybrid, and Lean (Martusewicz et al., 2024; Ivanov, 2022).

- **Performance Management Systems (PMSs):** per Henri's (2006) framework (as cited in Cosa & Torelli, 2024), cover monitoring, focus of attention, strategic decision-making, and legitimation. In the digital era PMSs have shifted from “rationalization machines” to strategic assets that support organizational adaptability and resilience. (Cosa & Torelli, 2024; Eriksson & Lycke, 2025).

- **RocaSalvatella Model:** A holistic model for DT incorporating strategic vision, operational processes, and organizational culture (Gallego Cossio et al., 2025; Cosa & Torelli, 2024).

- **Digital Maturity Models:** Measure DT progression based on digital intensity and transformation management intensity (Cosa & Torelli, 2024; Kwiotkowska, 2024; Li et al., 2022). High digital maturity fosters organizational resilience by developing sensing and seizing

capabilities (Kwiatkowska, 2024; Debnath et al., 2023; Zouari et al., 2021; Ziari & Taleizadeh, 2025; Castillo et al., 2025).

These frameworks provide operationalizations that measure DT progression, its influence on OA, and how OA mediates toward BR.

Key Concepts for Digital Agility and Resilience

- **Digital Capabilities:** Essential for SMEs' successful DT; deeper learning and stronger digital capacity support not only adaptation but also antifragility—the ability to grow stronger through disruptions (Sagala & Öri, 2025; Doukidis et al., 2024; Li et al., 2022; Ameen & Tarba, 2025; Maalouf et al., 2025).

- **Culture of Dignity:** Proposed as a neurocognitive infrastructure that shapes team thinking, creating an adaptive environment where information complexity becomes a productive variation of strategic options. It acts as a “soft architecture” connecting operational, coordination, and strategic management levels through trust and sensemaking. This culture is particularly relevant in contexts of digital exhaustion, fragmented interaction, and organizational turbulence (Korobkina & Dashenkova, 2025).

- **Transformational and Digital Leadership:** Leadership models that link strategic goal-setting with organizational adaptation and foster intelligent organizations where human–AI collaboration improves real-time decision-making; leadership agility and an innovation-oriented culture are central to Industry 5.0 values and resilient DT (Gallego Cossio et al., 2025; Razzak et al., 2025; Chatterjee et al., 2023; Castillo et al., 2025; Boumsisse et al., 2025; Assal, 2024; Gomaa, 2025; Syamsir et al., 2025).

- **Antifragility:** SMEs can not only survive but strengthen through crises when flexibility, agility, and robust digital capabilities are present (Sagala & Öri, 2025; Corvello et al., 2023).

- **Industry 4.0 and Industry 5.0:** Industry 4.0 (I4.0) encompasses advanced technologies such as AI, IoT, Big Data Analytics, and automation, all essential for supply chain agility and resilience (Giudice et al., 2021; Santhi & Muthuswamy, 2022; Han & Trimi, 2022;

Ivanov, 2022; Ghabak & Chaugule, 2024; Centobelli et al., 2020; Amrani et al., 2024). Industry 5.0 (I5.0) goes further, focusing on a human-centered technological paradigm that strengthens resilience and integrates sustainability into operations, emphasizing human–machine collaboration (Castillo et al., 2025; Kowalska et al., 2023; Rijwani et al., 2024; Moser et al., 2025; Belhadi et al., 2024; Chirumalla, 2021).

• **Innovation Capability and Agile Response:** DT supports innovation activities, enhancing firms' ability to respond to uncertainty and competition (Berawi et al., 2020; Li et al., 2022; Zhang et al., 2025). Agile responses improve information acquisition and transmission efficiency (Slaiby et al., 2025), enabling firms to adjust strategies flexibly and respond quickly to market fluctuations and crises (Nolte & Lindenmeier, 2024; Ivanov, 2022; Zhang et al., 2025; Rizana et al., 2024; Aljawazneh, 2024; Ghezzi & Cavallo, 2020).

These concepts integrate the mechanisms linking DT - OA – BR and reinforce the study's research model. This theoretical foundation guides the literature analysis and frames how digital transformation acts as a catalyst for agility and resilience in dynamic environments (Jelusic et al., 2024; Gallego Cossio et al., 2025; Rincón-Guio et al., 2025; Nolte & Lindenmeier, 2024; Rana et al., 2025).

METHODOLOGY

Design and guidelines

This study adopts a Systematic Literature Review (SLR) to synthesize evidence on the relationship between digital transformation (DT), organizational agility (OA), and business resilience (BR). The SLR offers a comprehensive, replicable, and less biased method for mapping emergent concepts, identifying gaps, and guiding future research in information systems and management. (Cosa & Torelli, 2024; Gallego Cossio et al., 2025; Pennetta, 2025; Sagala & Őri, 2025; Chavarnakul et al., 2025).

To ensure rigor, the SLR followed established guidelines, including PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) (Gallego Cossio et al., 2025; Pennetta, 2025; Joshi & Sharma, 2022) and the structured review principles of Tranfield et al. (2003) (Cosa & Torelli, 2024; Sagala & Őri, 2025).

Sources and search strategy

Primary studies were searched in Scopus and Web of Science, given their reputation for indexing high-quality publications in business, management, economics, and the social sciences (Gallego Cossio et al., 2025; Pennetta et al., 2025; Sagala & Őri, 2025)

The search strategy combined keywords aligned with the research questions:

- "digital transformation" OR "digital strategy" OR "digital disruption" OR "digitalize" OR "digitize" OR "IT transformation" OR "IS transformation"
- AND "organizational agility" OR "agile response" OR "flexibility" OR "adaptability"
- AND "business resilience" OR "organizational resilience" OR "enterprise resilience" OR "firm resilience" OR "antifragility"
- AND "post-pandemic" OR "COVID-19" OR "crisis" OR "disruption" OR "VUCA"

Filters limited results to peer-reviewed articles and reviews; academic books/chapters and conference papers included when offering quality empirical evidence or modeling, all in English. The time window spanned January 2018 to September 2025 to capture recent, post-pandemic insights (Gallego Cossio et al., 2025; Pennetta, 2025).

Eligibility criteria

- Inclusion criteria:
 - a) Empirical and systematic review articles in peer-reviewed journals, plus books, book chapters, and conference papers.
 - b) Written in English.
 - c) Studies examining relationships among DT, OA, and/or BR, including mediators/moderators.

d) Papers discussing strategies, frameworks, models, practices, barriers, enablers, or contextual factors of DT in relation to agility and resilience.

e) Publication within 2018–2025.

• Exclusion criteria:

a) Editorials, theses, preprints, or industry reports (unless used secondarily for context).

b) Articles not directly addressing the research questions.

c) Duplicates.

d) Outside the specified time range.

e) (repeat) Articles not directly addressing the research questions.

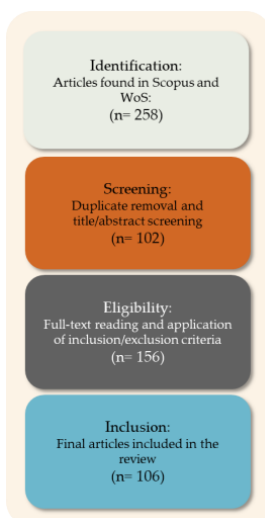
f) Studies addressing external factors and/or regulation in isolation (without SMEs' strategic responses).

Study selection (PRISMA)

The selection was carried out in stages following the PRISMA flow diagram presented in Figure 1, in order to minimize bias (Cosa & Torelli, 2024; Gallego Cossio et al., 2025; Pennetta, 2025, 2015; Joshi & Sharma, 2022).

Figure 1

PRISMA flow diagram for the systematic review



1. Identification: 258 initial records were retrieved from Scopus and Web of Science using the defined strategy.
2. Screening: 102 duplicates were removed from 258 records. The remaining 156 unique records were screened by title and abstract for relevance.
3. Eligibility: Full texts of the 156 articles were assessed against inclusion/exclusion criteria.
4. Inclusion: 106 articles met all criteria and were included in the qualitative synthesis

Data extraction and management

Data extraction covered title, authors, abstract, year, country, research questions, study design, sample size, and key findings (Cosa & Torelli, 2024; Gallego Cossio et al., 2025; Sagala & Öri, 2025; Pennetta, 2025).

Synthesis combined thematic analysis—following Wolcott’s (1994) steps of sketching, coding/condensing, and contextualizing—with topic modeling (NMF on a TF–IDF matrix of 156 abstracts) to identify ten emergent thematic clusters (Sagala & Öri, 2025; Gallego Cossio et al., 2025).

The results of the data extraction and synthesis are summarized in Table 1, which reports the ten thematic clusters derived from the combined qualitative and quantitative procedures.

Table 1

Clusters of Literature on Digital Transformation, Agility, and Resilience

Cluster	Name	N° of Articles	Top Keywords
1	Supply Chain Resilience 4.0 (AI/IoT/DT)	31	Supply, supply chain, chain, chain resilience, resilience, supply chains, chain, chains, agility, study, industry
2	Dynamic Capabilities (RBV/DCT), Digital Maturity, and Governance	29	industry, technologies, process, digital, business, innovation, development, management, data, systems

3	Dynamic Capabilities (RBV/DCT), Digital Maturity, and Governance	21	pandemic, crisis, small, covid, businesses, companies, covid pandemic, business, agility, digital
4	Dynamic Capabilities (RBV/DCT), Digital Maturity, and Governance	19	digital, digital transformation, transformation, organizational, organizational resilience, study, resilience, innovation, level, organizations
5	Leadership and Agile Culture for Resilient Digital Transformation	14	leadership, transformational, organizational, transformational leadership, organizational agility, agility, digital, innovation, resilience, transformation
6	Business Models, Ecosystems, and Digital Servitization	13	digital, models, business models, business, service, firm, bms, servitization, digitalization, agile
7	Dynamic Capabilities (RBV/DCT), Digital Maturity, and Governance	11	sc, scr, dynamic, sca, relationship, dynamic capabilities, positive, capabilities, capability, using
8	Dynamic Capabilities (RBV/DCT), Digital Maturity, and Governance	9	ai, creativity, agility, intelligence, intelligence ai, security, human, artificial intelligence, artificial, organizational
9	SMEs, Entrepreneurship, and Dynamic Capabilities	5	project, entrepreneurial, project management, management, ai, agile, resilience, study, sustainable, digital
10	Supply Chain Resilience 4.0 (AI/IoT/DT)	4	food, supply, production, cloud, chains, ai, supply chain, chain, reduce, disruptions

Methodological quality and risk of bias

Quality appraisal was tailored to design: MMAT (mixed/quantitative/qualitative), CASP (qualitative), and JBI (case/observational). Biases (selection, measurement, reporting) were logged, and sensitivity analyses were run excluding lower-quality studies when synthesizing key effects.

Synthesis and linkage to RQs 297

Given conceptual and measurement heterogeneity, we used qualitative synthesis reinforced with vote-counting and method triangulation (PLS-SEM, case studies, fsQCA).

- RQ1 (DT–OA–BR relationships): tabulated β , t, p, f^2 , R^2 (when available), identified direct/indirect effects and causal chains; output: relationships table + structural model.
- RQ2 (Frameworks/models/practices for OA): evidence mapping across frameworks (RBV, DCT, EFQM, maturity, I4.0/I5.0) and practices (I4.0 tech stack, BI/analytics, agile methods, KM/learning, networks); output: frameworks/practices table and visual map (Zabraoui, Chafi, & Alami, 2026).
- RQ3 (Mechanisms OA → BR): synthesis of mediations (innovation, ISAMB, OA) and operational mechanisms (DSC/visibility, automation/standardization, data-driven decision-making, learning and process redesign); output: mediation table (total/direct/indirect + p) and mechanism diagram.
- RQ4 (Barriers, enablers, contextual factors): thematic analysis and subgrouping by region/size/intensity/maturity/industry; output: barriers/enablers/context table and heterogeneity table.

RESULTS

This section presents the key empirical findings from recent literature, organized by the research questions. The reviewed studies employed quantitative analyses (PLS-SEM, fsQCA, regression), systematic literature reviews (SLR), and qualitative designs, offering a multifaceted view of how DT, OA, and BR interact.

Thematic cluster from abstracts

Topic modeling (NMF) revealed ten dominant clusters:

- 1. Supply Chain Resilience 4.0 (AI/IoT/DT):** Focus on Industry 4.0 technologies (AI, IoT, data analytics, DT) to achieve end-to-end visibility, agility, and continuity in supply chains

(Santhi & Muthuswamy, 2022; Ghabak & Chaugule, 2024; Jelisic et al., 2024; Joshi & Sharma, 2022; Ziari & Taleizadeh, 2025; Hamieddine & Akioud, 2025).

- Frequent keywords: supply, supply chain, chain, chain resilience, resilience, supply chains, chains, chain agility, study, industry.

- # of articles: 31

2. Dynamic Capabilities (RBV/DCT), Digital Maturity, and Governance: RBV and DCT, digital maturity, and governance as key to sensing, seizing, and reconfiguring for sustained DT (Kwiatkowska, 2024; Sagala & Öri, 2025; Chavarnakul et al., 2025).

- Frequent keywords: industry, technologies, process, digital, business, innovation, development, management, data, systems.

- # of articles: 29

3. Dynamic Capabilities, Digital Maturity, and SME Resilience under Crisis: Focus on pandemics, antifragility, and agility (Sagala & Öri, 2025; Corvello et al., 2023; Ramírez-Soto et al., 2024).

- Frequent keywords: pandemic, crisis, small, covid, businesses, companies, covid pandemic, business, agility, digital.

- # of articles: 21

4. Digital Transformation, Dynamic Capabilities, and Organizational Resilience: Direct link between DT and organizational resilience, highlighting roles of dynamic capabilities and innovation (Zhang et al., 2025; Kwiatkowska, 2024)

- Frequent keywords: digital, digital transformation, transformation, organizational, organizational resilience, study, resilience, innovation, level, organizations.

- # of articles: 19

5. Agile Leadership and Culture for Resilient DT

- Description: The critical role of leadership and culture in enabling successful DT, promoting agility and resilience (Castillo et al., 2025; Korobkina & Dashenkova, 2025; Nugraha et al., 2025; Razzak et al., 2025).

- Frequent keywords: leadership, transformational, organizational, transformational leadership, organizational agility, agility, digital, innovation, resilience, transformation.

- # of articles: 14

6. Business Models, Ecosystems, and Digital Servitization: How digitalization enables business model evolution, innovative ecosystems, and servitization to create value and resilience (Attah-Boakye et al., 2023; Sagala & Öri, 2025; Pennetta, 2025).

- Frequent keywords: digital, models, business models, business, service, firm, bmi, servitization, digitalization, agile.

- # of articles: 13

7. Dynamic Capabilities (RBV/DCT), Digital Maturity, and Governance: Subset reinforcing dynamic capabilities, digital maturity, and governance for DT-to-resilience (Kumar & Singh, 2025; Martusewicz et al., 2024; Li et al., 2022; Razzak et al., 2025; Hayes, 2025; Kioskli et al., 2025; Oltra- Rodríguez et al., 2025).

- Frequent keywords: sc, scr, dynamic, sca, relationship, dynamic capabilities, positive, capabilities, capability, using.

- # of articles: 11 379

8. Dynamic Capabilities (RBV/DCT), Digital Maturity, and Governance: Another subset deepening interactions among dynamic capabilities, digital maturity, and governance in DT for agility and resilience (Moser et al., 2025; Sharma et al., 2025; Mutambik, 2024; Piprani et al., 2024).

- Frequent keywords: ai, creativity, agility, intelligence, intelligence ai, security, human, artificial intelligence, artificial, organisational.

- # of articles: 9

9. SMEs, Entrepreneurship, and Dynamic Capabilities: Focus on digital competence, literacy, and strategic agility as pillars of resilience in SMEs and entrepreneurial contexts (Hamieddine & Akioud, 2025; Sagala & Óri, 2025; Han & Trimi, 2022; Kiani, 2024; Pennetta et al., 2025; Shatila et al., 2025; Ramírez-Soto et al., 2024; Nugraha et al., 2025).

- Frequent keywords: project, entrepreneurial, project management, management, ai, agile, resilience, study, sustainable, digital.

- # of articles: 5

10. Supply Chain Resilience 4.0 (AI/IoT/DT) in the Food Sector: Application of Industry 4.0 (AI, IoT, analytics, DT) in food supply chains to improve visibility, agility, and continuity, mitigating disruptions (Sutar et al., 2024; Kowalska et al., 2023; Seknametla, 2025; Santhi & Muthuswamy, 2022; Lakhoul & Soulhi, 2024).

- Frequent keywords: food, supply, production, cloud, chains, ai, supply chain, chain, reduce, disruptions.

- # of articles: 4

These clusters provide a structured basis for deepening the review and contextualizing RQ findings within dominant themes.

RQ1 — DT–OA–BR relationships (direct and mediated)

Key findings:

- DT → BR (direct): positive effects on resistance ($\beta \approx 0.16$, $p < 0.01$) and recovery ($\beta \approx 0.08$, $p < 0.01$) in manufacturing and regulated service contexts.

- DT → OA: digitalization improves information acquisition/transmission, reconfigures resources, and accelerates response (evidence from PLS-SEM and supply-chain studies).

- OA → BR: OA acts as a dynamic capability enhancing robustness and adaptability; at supply-chain level, ACAP → SCA ($\beta \approx 0.70$) and SCR ($\beta \approx 0.65$).

Mediations (DT → OA/Innovation → BR):

- Innovation capability partially mediates DT → BR (stronger on recovery).

- Agile response partially mediates DT → resistance and recovery.
- IS ambidexterity mediating the effects of IQ, Innov, and IT-Cap on HRIS effectiveness, reinforcing OA and BR outcomes.

RQ2 — Frameworks, models, and practices that drive OA

Frameworks/models

- RBV/DCT: foundation for sensing–seizing–reconfiguring supporting OA and BR.
- EFQM 2025 & digital maturity: align purpose, data, and continuity; maturity (digital intensity + transformation management intensity) associates with higher BR.
- DOI: innovation adoption builds digital competences and thus OA.

Digital maturity models such as the smart-factory model show how digitalization enables process innovation and strengthens dynamic capabilities in manufacturing (Sjödin, Parida, Leksell, & Petrovic, 2018).

Practices

- Investment in I4.0 (AI, IoT, BDA, blockchain): greater end-to-end visibility, agility, and resilience.
- Staff digital capabilities (IT-Cap), executive innovativeness, and IS ambidexterity: direct enablers of OA.
- Agile/Lean Startup: accelerate learning and pivoting.
- Sector-specific need assessment: avoids the “digital paradox” and maximizes impact.

RQ3 — How does digitalized OA translate into BR?

Observed mechanisms

- Digital Supply Chains (DSCs): higher E2E visibility, collaboration, responsiveness → lower risk and faster recovery.
- Efficient decision-making: automation/standardization reduce error and support continuity.

- Continuous innovation and adaptability: DT underpin innovation initiatives that buffer shocks.

RQ4 — Moderators (barriers, enablers, and context)

- Barriers: resistance to change, cultural/digital literacy gaps, financial constraints, data quality, cyber/integration risks, “digital paradox.”
- Enablers: digital/transformational leadership, dynamic capabilities (incl. ACAP), culture of dignity, I4.0 investment, learning & knowledge management, networks/collaboration.
- Context: firm size (SMEs vs. large), life-cycle stage (growth/maturity), geography, digital maturity, regulatory environment.

Notable quantitative anchors (to ground the model)

- DT → BR: $\beta \approx 0.16$ (resistance), $\beta \approx 0.08$ (recovery), $p0$, $p < 0.01$
- ACAP → SCA/SCR: $\beta \approx 0.70$ / $\beta \approx 0.65$, $p < 0.001$.
- Innovation (mediation): stronger on recovery; agile response mediates resistance and recovery.
- IS ambidexterity (mediation): positive mediation of IQ, Innov, IT-Cap → HRIS effectiveness ($\beta > 0$, $p < 0.05$).

Tables 2 and 3 present a synthesis of the literature, with Table 2 mapping thematic clusters on the interplay between Digital Transformation (DT), Organizational Agility (OA), and Business Resilience (BR), and Table 3 summarizing key indicators of analysis, including barriers, facilitators, and contextual factors.

Table 2

Synthesis table — DT, OA, and BR

Relationship	Theoretical Evidence	Empirical Evidence	Key Authors
DT → OA	RBV/DCT: resources and dynamic capabilities as	Digitalization improves information acquisition	Siddique et al. (2025); Sagala & Ori

	the basis of agility. Digital maturity: digital intensity + transformation management. IS-Ambidexterity: simultaneous exploration and exploitation of IS resources	and transmission. Rapid reconfiguration of internal/external resources. Digital supply chains increase flexibility and adaptability.	(2025); Aljawazneh (2024); Li et al. (2022); Abourookbah et al. (2023); Starke & Ludvigia (2025).
DT → BR	DCT/IPT: integration of digital processes enhances resilience. Innovation and flexibility: key to resistance and recovery.	DT has a positive impact on resistance ($\beta=0.159$, $p<0.01$) and recovery ($\beta=0.079$, $p<0.01$). Optimization of innovation and agility to face disruptions. Effective HRIS strengthen organizational resilience.	Zhang et al. (2025); Kwitkowska (2024); Siddique et al. (2025); Pennetta (2025); Joshi & Sharma (2022); Adam & Kopanaki (2025); Dąbrowska et al. (2022).
OA → BR	Dynamic capabilities: sensing, seizing, reconfiguring. Psychological and social resilience: self-efficacy and emotional regulation.	ACAP → SCA ($\beta=0.698$, $p<0.001$), SCR ($\beta=0.649$, $p<0.001$). Agility improves customer service, differentiation, and robustness. BR influenced by psychological and cultural resilience.	Abourookbah et al. (2023); Pennetta (2025); Syamsir et al. (2025); Zhang et al. (2025); Nolte & Lindemeier (2024); Bai et al. (2025).
DT → OA → BR (mediation)	OA as an operational mechanism translating digital capabilities into resilience. Innovation and agile response as critical mediators.	Innovation mediates 5.86% of the DT–BR relationship ($p=0.041$). Agile response mediates 13–15% of the DT–BR relationship. IS-Ambidexterity mediates the effect of IQ, Inov, and IT-Cap on HRIS	Zhang et al. (2025); Rana et al. (2025); Ivanov (2022); Berawi et al. (2020); Siddique et al. (2025).

		effectiveness.	
Moderators (context, barriers, facilitators)	Organizational culture: dignity, trust, continuous learning. Leadership: digital, transformational, paradoxical. Firm size/digital maturity: differences between SMEs and large firms	Digital leadership and dynamic capabilities strengthen DT→OA and OA→BR. Barriers: resistance, digital gaps, financial constraints. Stronger effects in capital-intensive and service industries with high digital maturity.	Castillo et al. (2025); Korobkin & Dashenkova (2025); Nugraha et al. (2025); Razzak et al. (2025); Kwitkowska (2024); Ahmed (2024); Abourookbah et al. (2023).

Summary indicators

Table 3

Indicators of Analysis (Barriers, Facilitators, and Contextual Factors)

Category	Identified Elements	Key Authors
Barriers	Resistance to change; financial constraints; “digital paradox”; data quality issues; digital skill gaps; cybersecurity/integration risks	Sagala & Ōri (2025); Zhang et al. (2025); Aljawazneh (2024)
Facilitators	Digital/transformational leadership; dynamic capabilities (incl. ACAP); dignity culture; investment in Industry 4.0; continuous learning and knowledge management; collaboration and networks	Siddique et al. (2025); Korobkina & Dashenkova (2025); Joshi & Sharma (2022)
Contextual Factors	Firm size; digital maturity; business life-cycle stage; geographic location; regulatory environment	Martusiewicz et al. (2024); Zhang et al. (2025); Abourookbah et al. (2023)

DISCUSIÓN

These clusters provide a structured basis for deepening the review and contextualizing RQ findings within dominant themes.

RQ1 — Model implication: strong evidence for a direct DT→BR path and a mediated DT→OA→BR route; IS ambidexterity is a key operating mechanism.

RQ2 — Model implication: frameworks define capabilities and routines that operationalize the DT→OA route, strengthening the subsequent DT/OA→BR link.

RQ3 — Model implication: OA is the functional bridge between DT and BR (operational and strategic), especially in VUCA contexts.

RQ4 — Model implication: Barriers, enablers 4.0, and context modulate the strength of DT→OA and OA→BR; they should inform strategy design and the interpretation of heterogeneous effects.

CONCLUSIONS

This systematic literature review met its stated objectives by providing a comprehensive synthesis of the relationship between digital transformation (TD), organizational agility (AO), and business resilience (RE) in the post-pandemic context.

In response to RQ1, the literature confirms a robust and positive empirical and conceptual relationship among TD, AO, and RE. TD functions as a direct antecedent of resilience, and this relationship is mediated by the organization's innovation capacity and agile response (Zhang et al., 2025; Kwiotkowska, 2024; Siddique et al., 2025).

Regarding RQ2, the literature identifies RBV, DCT (with micro-foundations: sensing, seizing, reconfiguring), IPT, SCT, and DOI as core frameworks; practical enablers include EFQM 2025 and digital-maturity models and practices such as Industry 4.0 investment, employee digital upskilling, executive innovation, and IS-ambidexterity—these jointly drive organizational agility. (Siddique et al., 2025; Martusewicz et al., 2024; Kwiotkowska, 2024; Starke & Ludviga, 2025)

With respect to RQ3, organizational agility — strengthened by digitalization — translates into greater business resilience by enabling rapid adaptation to VUCA environments, the

deployment of agile digital supply chains, more efficient decision-making, enhanced innovation capacity, and the identification of new business opportunities amid disruptions (Pennetta, 2025; Ivanov, 2022; Zhang et al., 2025).

Finally, RQ4 shows that barriers include resistance to change, cultural shortcomings, financial constraints, and the so-called “digital paradox” (Castillo et al., 2025; Sagala & Öri, 2025; Zhang et al., 2025). Facilitators comprise proactive digital leadership, dynamic capabilities (including ACAP), an adaptive organizational culture, and investment in human and technological capital. Contextual factors — such as firm size, life-cycle stage, factor intensity (e.g., capital- vs. labor-intensive), and geographic location — moderate the effectiveness of TD in improving agility and resilience (Kwiatkowska, 2024; Zhang et al., 2025)

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Author contributions:

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Carlos Alberto Jiménez Vera (second author): Conceptualization; Data curation; Formal analysis; Research; Methodology; Software; Writing — review & editing.

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Declaration of artificial intelligence use:

Declaration of artificial intelligence use: The authors confirm that they used artificial intelligence tools to assist with the preparation of this article. These tools did not replace any of the authors' intellectual work. Following rigorous checks using multiple plagiarism-detection tools, the results of which are documented in the supporting evidence, the authors confirm that

this manuscript is the product of their own intellectual work and has not been generated or published by any electronic or AI platform.

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