International Journal Administration, Business & Organization
Vol. 6 (3), 2025: 457-471| E-ISSN 2721-5652
Available at https://ijabo.a3i.or.id/index.php/ijabo

Digital Transformation and Organizational Resilience: The Mediating Role of Digital Literacy

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ABSTRACT

In an increasingly turbulent and digitalized environment, organizational resilience has become a critical capability enabling organizations to survive and thrive amid unexpected disruptions. Drawing on the digital transformation and organizational resilience framework, this study examines the role of digital literacy as a mediating mechanism through which digital transformation enhances organizational resilience. Although prior studies highlight the importance of digital transformation in strengthening resilience, limited attention has been given to the human-capability mechanisms that explain how this relationship unfolds. Addressing this gap, the present study integrates digital literacy into the digital transformation and organizational resilience. Using a quantitative research design, data were collected from 224 SME owners in the retail sector in Greater Bandung and analyzed using structural equation modeling. The results indicate that digital transformation has a positive and significant effect on digital literacy, suggesting that digitally mature organizations are more likely to foster owner digital capabilities. In addition, digital transformation is found to directly and positively influence organizational resilience. Most importantly, the findings demonstrate that digital literacy partially mediates the relationship between digital transformation and organizational resilience. This suggests that digital transformation strengthens organizational resilience not only through technological and structural mechanisms, but also by enhancing their ability to effectively use and adapt digital technologies.

Keywords: Digital Transformation; Digital Literacy; Organizational Resilience; SMEs Retail Sector

Received: 20 November 2025
Accepted: 16 December 2025
Available online: 27 December 2025

DOI*:* 10.61242/ijabo.25.684

JEL Classifications: M14, L26, L81

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INTRODUCTION

Organizations today operate in an environment characterized by rapid technological change, uncertainty, and frequent disruptions, such as economic crises, natural disasters, and global pandemics (Chaniago, 2021). The COVID-19 pandemic, in particular, has highlighted the vulnerability of organizations to unexpected external shocks and underscored the importance of organizational resilience as a strategic capability (Chaniago & Efawati, 2024; Weritz et al., 2025). Organizational resilience refers to an organization's ability to anticipate, respond to, adapt to, and recover from disruptive events while maintaining core functions and pursuing long-term sustainability (He et al., 2023; Mehta et al., 2024).

In response to such turbulence, many organizations have increasingly relied on digital transformation as a means to enhance flexibility, agility, and adaptive capacity (Chaniago, 2023a). Digital transformation is defined as a process that leverages digital technologies to fundamentally change organizational processes, business models, and value creation mechanisms (Vial, 2019). Empirical evidence shows that organizations with higher levels of digital maturity were better able to sustain operations and adapt during the COVID-19 crisis compared to those with limited digital capabilities (Heredia et al., 2022; Nurain et al., 2024). However, digital transformation is not merely a technological issue. Prior studies emphasize that its success depends heavily on organizational culture, leadership, and human capabilities (Efawati, 2024; Efawati et al., 2021). Among these human-centered factors, digital literacy has emerged as a critical capability enabling employees to effectively use, interpret, and adapt digital technologies in complex and uncertain environments (Nurain et al., 2024). Digital literacy encompasses not only technical skills but also cognitive and social competencies that allow individuals to critically evaluate digital information and collaborate through digital platforms (Fadhlan Thariq & Yen Efawati, 2024).

Despite the growing recognition of digital transformation as an antecedent of organizational resilience, the role of digital literacy in this relationship remains underexplored. He et al. (2023) demonstrate that digital transformation enhances organizational resilience through digital maturity dimensions such as digital intensity and transformation management intensity, yet they also acknowledge that technology investments alone may not directly strengthen employees' adaptive capabilities (Westerman et al., 2012) . This observation suggests that individual-level competencies, particularly digital literacy, may play a pivotal role in translating digital transformation initiatives into resilient organizational outcomes.

Although prior research has established a positive relationship between digital transformation and organizational resilience, several unresolved issues remain. First, many organizations invest heavily in digital technologies but fail to achieve the expected resilience outcomes, especially in terms of employee adaptability and proactive problem-solving (Kane & Carrasco, 2025). This phenomenon indicates that technological investments alone are insufficient to build resilience in the absence of adequate human capabilities. Second, existing resilience studies have predominantly focused on organizational-level factors, such as systems, processes, and leadership structures, while paying relatively limited attention to employee-level competencies (Chaniago & Efawati, 2024; Efawati et al., 2021). He et al. (2023) explicitly note that digital intensity does not necessarily enhance employees' individual contributions to resilience, such as situation awareness and adaptive capacity, unless supported by appropriate managerial and cultural mechanisms. Third, although digital literacy has been widely discussed in educational and individual performance contexts, its role in strengthening organizational resilience remains insufficiently theorized and empirically tested. As organizations increasingly

 DOI: https://doi.org/10.61242/ijabo.25.684

depend on digitally mediated work processes, the lack of digital literacy among employees may become a critical barrier to resilience, particularly during crises that require rapid sense-making and innovation (Efawati, 2024). A review of the extant literature reveals three major research gaps. First, while (Chaniago, 2023b) provide a robust empirical examination of how digital transformation influences organizational resilience, their study primarily conceptualizes resilience through organizational systems and leadership mechanisms, leaving limited room for examining employee-level digital competencies. Consequently, the micro-foundations of resilience in digitally transformed organizations remain underdeveloped. Second, digital literacy has largely been examined as an individual skill set related to learning, education, or job performance, rather than as a strategic organizational capability that contributes to resilience (Chaniago, 2022a). There is a lack of integrative frameworks that position digital literacy alongside digital transformation as a key driver of organizational resilience.

Third, existing studies tend to examine digital transformation and organizational resilience in isolation, without sufficiently addressing the interaction between technological change and human capital. Bonnet & Westerman (2021) highlight that transformation management intensity plays a crucial role in empowering employees during crises, implicitly suggesting that employees' digital competencies may amplify or constrain the resilience benefits of digital transformation. However, this relationship has not been explicitly modeled or empirically tested. Based on the identified gaps, this study aims to extend the digital transformation and organizational resilience literature by incorporating digital literacy as a critical explanatory variable. Specifically, the objectives of this study are: To examine the effect of digital transformation on organizational resilience, to analyze the influence of digital literacy on organizational resilience, and to investigate the combined role of digital transformation and digital literacy in enhancing organizational resilience. By achieving these objectives, the study seeks to provide a more comprehensive understanding of how technological and human capabilities jointly contribute to organizational resilience in uncertain and disruptive environments.

LITERATURE REVIEW

Figure 1 illustrates the research model. This study proposes a conceptual model in which digital transformation directly influences both digital literacy and organizational resilience, while digital literacy serves as a mediating variable linking digital transformation to organizational resilience.

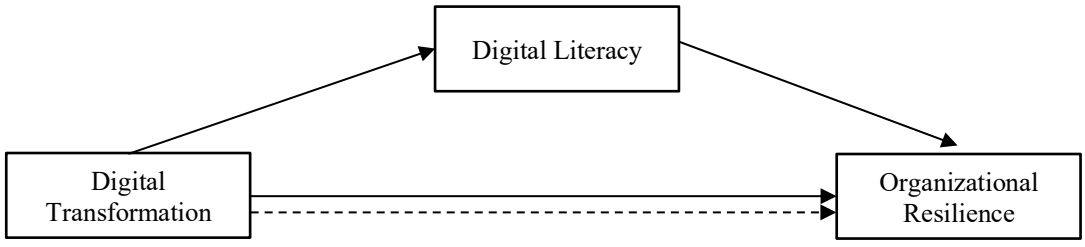

Figure 1. Model of Research
Source: Own Compilation, 2025

Digital Transformation and Digital Literacy

Digital transformation reshapes the way employees interact with technology, information, and one another (Ben Ghrbeia & Alzubi, 2024). As organizations introduce advanced digital tools and platforms, employees are required to acquire new skills and

 DOI: https://doi.org/10.61242/ijabo.25.684

competencies to effectively perform their tasks. Consequently, digital transformation creates an environment that stimulates learning and skill development, thereby enhancing digital literacy (Arnaud et al., 2025). Ahsan (2025) argue that digitally mature organizations actively invest in digital skills development and foster a culture of continuous learning. Similarly, Hinterhuber et al. (2021) find that transformation management intensity, characterized by digital vision, governance, and culture, plays a critical role in empowering employees and enabling them to grow their capabilities during turbulent times. Although their study does not explicitly examine digital literacy, their findings imply that digitally transformative leadership facilitates the development of employee competencies necessary for effective technology use. From a dynamic capabilities perspective, digital transformation can be understood as a higher-order capability that enables organizations to build and renew lower-order capabilities, including digital literacy (Guandalini, 2022). As employees engage with digital technologies embedded in transformed organizational processes, they progressively enhance their ability to understand, evaluate, and utilize digital tools in complex situations. Thus, we propose the first hypothesis:

H1: Digital transformation has a positive effect on digital literacy.

Digital Transformation and Organizational Resilience

A growing body of literature highlights digital transformation as a key antecedent of organizational resilience. Digital technologies enable organizations to monitor environmental changes, maintain communication during disruptions, and reconfigure resources in response to emerging threats (He et al., 2023). Saiful et al. (2025) provide strong empirical evidence that digital transformation enhances organizational resilience by strengthening both systematic control and, indirectly, individual contributions. Their findings indicate that digital intensity improves organizations' ability to sustain operations, while transformation management intensity equips organizations with leadership and governance mechanisms that support adaptive responses (Suryani & Chaniago, 2023). Moreover, digitally transformed organizations are better positioned to experiment with new business models, leverage external networks, and rapidly implement innovative solutions during crises (Chaniago, 2022b). These capabilities are central to the anticipatory, adaptive, and transformative dimensions of organizational resilience. Thus, we propose the second hypothesis:

H2: Digital transformation has a positive effect on organizational resilience.

Digital Literacy and Organizational Resilience

A growing body of research emphasizes digital literacy as a fundamental determinant of organizational resilience. Digital literacy empowers employees and organizations to effectively use, interpret, and adapt to emerging technologies, thereby enhancing their capacity to respond to disruptions and environmental volatility (Ben Ghrbeia & Alzubi, 2024). According to Pilav-Velić et al. (2021) and Kass-Hanna et al. (2022), digital literacy improves resilience by enabling organizations to maintain communication, coordinate remote operations, and implement digital solutions during crises. Furthermore, Maran et al. (2022) and Gomez-Trujillo & Gonzalez-Perez (2022) argue that digital competence supports adaptive learning and innovation, allowing organizations to transform challenges into opportunities for growth. Empirical findings by Heredia et al. (2022) indicate that employees with higher digital proficiency contribute more effectively to organizational flexibility and continuity during disruptions such as the COVID-19

 DOI: https://doi.org/10.61242/ijabo.25.684

pandemic. Collectively, these studies suggest that digital literacy enhances organizations' anticipatory, coping, and adaptive capacities, three essential dimensions of resilience. Thus, we propose the third hypothesis:

H3: Digital literacy has a positive effect on organizational resilience**.**

The Mediating Role of Digital Literacy

While digital transformation provides technological infrastructure and strategic direction, the actual realization of resilience outcomes depends heavily on employees' ability to effectively use digital tools (Imran et al., 2025). Digital literacy enables employees to interpret digital information, coordinate through digital platforms, and develop adaptive solutions under conditions of uncertainty. (Udimal et al., 2021) note that investments in digital technologies do not automatically translate into enhanced individual capabilities unless supported by appropriate human-centered mechanisms (Saiful et al., 2025). This insight suggests that digital literacy may serve as a critical mediating mechanism through which digital transformation influences organizational resilience. From a micro-foundations perspective, organizational resilience emerges from the aggregation of individual actions and capabilities (Broccardo et al., 2023). Digitally literate employees are better equipped to detect early warning signals, share information across digital channels, and creatively respond to disruptions(Chatterjee et al., 2023). Consequently, digital literacy acts as a bridge that connects organizational-level digital transformation initiatives with resilience outcomes. By positioning digital literacy as a mediator, this study extends the digital transformation resilience literature by explicitly incorporating a human capital mechanism that explains how and why digital transformation enhances organizational resilience. Thus, we propose the third hypothesis:

H4: Digital literacy mediates the relationship between digital transformation and organizational resilience**.**

RESEARCH METHOD

This study adopts a quantitative research design using a cross-sectional survey approach, which is appropriate for testing causal relationships among latent constructs within a theoretical model. This design is consistent with prior empirical research examining digital transformation and organizational resilience in turbulent environments. A deductive approach is employed to test the proposed hypotheses derived from the literature, particularly focusing on the direct effects of digital transformation on digital literacy and organizational resilience, as well as the mediating role of digital literacy. The target population of this study consists of SMES of ritel sector in Greater Bandung (Bandung city, Cimahi city, and Bandung Barat district). This population selection aligns with (Chaniago et al., 2023), who argue that SMEs in ritel sector are particularly vulnerable to environmental disruptions due to their labor-intensive and interaction-dependent characteristics.

Data are collected using an online survey platform from March – May 2025, targeting owners who have direct experience with digital technologies in their daily work. To ensure data quality, respondents are required to meet the following criteria: Respondents were purposively selected MSMEs operating for at least 3 years, employing up to 19 permanent staff, and earning a maximum monthly turnover of IDR 50 million. They were also to have utilized digital tools (e.g., e-payments, social media). A non-probability purposive sampling technique is applied, which is commonly used in

 DOI: https://doi.org/10.61242/ijabo.25.684

organizational and management research when access to a complete sampling frame is limited. Data are collected through a structured self-administered questionnaire distributed electronically. Participation is voluntary, and respondents are assured of anonymity and confidentiality to reduce social desirability bias. The total sample size is 224 respondents.

Digital transformation is operationalized using the concept of digital maturity, adapted from the two-dimensional scale developed by (Westerman et al., 2012). This construct consists of two dimensions: Digital Intensity (DI), reflecting the extent to which an organization invests in and utilizes digital technologies to transform business processes, customer engagement, and service delivery. Transformation Management Intensity (TMI): capturing leadership vision, governance, coordination, and cultural support for digital transformation. Sample items include: "We use digital technologies to improve operational processes in new ways." This measurement approach has demonstrated high reliability and validity in prior studies (Cronbach's alpha > 0.83).

Digital literacy is measured as an individual-level capability reflecting owner' ability to effectively use, evaluate, and adapt digital technologies in their work context. The measurement items are adapted from (Permana et al., 2024) and refined for organizational settings. Digital literacy is conceptualized as a unidimensional reflective construct encompassing: Technical digital skills; Cognitive ability to evaluate digital information; Social capability to collaborate through digital platforms. Sample items include: "I feel confident using digital technologies to perform my job tasks." This operationalization aligns with (Pilav-Velić et al., 2021), who emphasize that employees' capabilities are critical micro-foundations of organizational resilience, even though digital literacy was not explicitly measured in their study.

Organizational resilience is measured by adapting the validated resilience scale developed by (He et al., 2023). Based on their empirical findings, organizational resilience is operationalized as a two-dimensional construct: Individual Contribution (IC), reflecting employees' ability to sense environmental changes and develop adaptive solutions; Systematic Control (SC), representing organizational systems and resource coordination to manage vulnerabilities. Sample items include: "People in our company have the information they need to respond to unexpected problems." This measurement model has demonstrated strong psychometric properties, including high composite reliability and convergent validity.

Before full data collection, the questionnaire is pilot-tested with a small group of respondents to ensure clarity, readability, and content validity. All constructs in this study are measured using multi-item scales adapted from established and validated instruments in prior studies. Responses are recorded on a five-point Likert scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

Measurement Model

Reliability and Convergent Validity

The measurement model is evaluated using Structural Equation Modeling (SEM) following a two-step approach: (1) assessment of the measurement model and (2) testing of the structural model. Reliability is assessed using: Cronbach's alpha (α); Composite Reliability (CR). Convergent validity is evaluated by examining: Standardized factor loadings (≥ 0.70); Average Variance Extracted (AVE ≥ 0.50); All constructs are expected to meet these recommended thresholds, consistent with prior findings reported by (Hair et al., 2022).

 DOI: https://doi.org/10.61242/ijabo.25.684

Discriminant Validity
Discriminant validity is assessed using the Fornell–Larcker criterion, in which the square root of each construct's AVE must exceed its correlations with other constructs. Additionally, cross-loading analysis is conducted to ensure that each item loads higher on its intended construct than on others.

Common Method Bias
To address potential common method bias, several procedural and statistical remedies are employed. Procedurally, anonymity is ensured, and scale items are carefully worded. Statistically, Harman's single-factor test is conducted to confirm that no single factor accounts for the majority of variance, following the approach adopted by (Sarstedt et al., 2017).

Mediation Testing Procedure
The mediating role of digital literacy is tested using bootstrapping techniques within SEM, which provide robust estimates of indirect effects (Hair et al., 2019). Mediation is supported if: Digital transformation significantly affects digital literacy; Digital literacy significantly affects organizational resilience; The indirect effect is statistically significant. This procedure aligns with contemporary mediation analysis practices in organizational research and extends the analytical approach by incorporating a human-capability mechanism.

RESEARCH RESULTS

The demographic characteristics of the respondents are summarized as follows: Among the 224 respondents, 101 (45%) were male, and 123 (55%) were female. In terms of age, 58 (26%) were under 30 years old, 78 (35%) were between 30 - 40 years old, 65 (30%) were between 40 - 50 years old, and 23 (9%) were over 50 years old. Regarding educational attainment, 17 (8%) had completed junior high school, 87 (39%) had completed senior high school, 98 (44%) had a bachelor's degree, and 22 (9%) had a master's degree. As for work experience, 54 (24%) had less than three years, 101 (45%) had three to six years, and 69 (31%) had more than seven years of experience.

Validity and Reliability Test Results
This study identified four latent variables with 18 indicators. The Digital Transformation variable had six indicators, the Digital Literacy variable had six indicators, and the Organizational Resilience variable had six indicators. The validity and reliability of each indicator within the four variables were assessed by assessing the loading factor value for each indicator. If the value is greater than 0.5, the indicator is considered valid (Hair Jr et al., 2010). This means that the measurement results for each indicator are accurate and relevant to the concept or variable being measured. The reliability of the measurement model was assessed using SMARTPLS 4 software and Cronbach's α, with a value of at least 0.5 and preferably greater than 0.7 (Hair et al., 2021). The results, as shown in Table 1, indicate that the Cronbach's α values ranged from 0.812 to 0.887, suggesting a high level of internal consistency for the scale.

 DOI: https://doi.org/10.61242/ijabo.25.684

Table 1. Reliability and Validity Test Results

Variable	Indicator	Loading factor	Composite Reliability (rho_a)	AVE	Cronbach α	VIF
Digital transformation	DT1	0.720	0.914	0.628	0.812	1.761
	DT2	0.796				1.736
	DT3	0.739				1.908
	DT4	0.756				1.881
	DT5	0.764				1.563
	DT6	0.727				1.850
Digital literacy	DL1	0.773	0.869	0.585	0.810	1.510
	DL2	0.788				1.648
	DL3	0.748				1.835
	DL4	0.768				1.583
	DL5	0.767				1.509
	DL6	0.731				1.673
Organization resilience	OR1	0.852	0.870	0.656	0.887	3.185
	OR2	0.873				3.183
	OR3	0.886				3.981
	OR4	0.858				3.291
	OR5	0.872				3.531
	OR6	0.873				3.260

Source: Own Compilation (2025)

The Fornell and Larcker test was used to assess discriminant validity, for which the square root of the AVE for each latent variable must be greater than the correlation among the latent variables. Table 2 shows that the AVE root values are 0.775, 0.712, and 0.715. The AVE root values are greater than the correlations between them: 0.681, 0.544, and 0.511. According to Fornell and Larcker's criterion, the analysis meets the requirements of discriminant validity.

Table 2. Discriminant Validity Fornell and Larcker's Criterion

	Organization Resilience	Digital Transformation	Digital Literacy
Organization Resilience	0.775		
Digital Transformation	0.681	0.712	
Digital Literacy	0.544	0.511	0.715

Source: Own Compilation (2025)

Table 3. Total Effects

	Original sample (O)	Sample mean (M)	Std. dev	T statistics (O/Std.dev)	P values
Digital Transformation -> Organizational Resilience	0.672	0.679	0.041	17.043	0.000
Digital Transformation -> Digital Literacy	0.498	0.509	0.053	9.114	0.000
Digital Literacy -> Organization Resilience	0.243	0.258	0.054	4.364	0.000

Source: Own Compilation (2025)

H1 proposes that digital transformation has a positive and significant effect on organizational resilience. The total effect of digital transformation on organizational resilienceis positive and significant ($\beta = 0.672$, $p < 0.05$; Table 3). Therefore, H1 is accepted. To improve organizational resilience, SMEs need to adopt a digital transformation approach to help them innovatively achieve their goals. They can also

 DOI: https://doi.org/10.61242/ijabo.25.684

invest to hire young people with digital skills to bring new solutions to the business. Furthermore, SME employees should be motivated to contribute digitalization ideas to solve the firm's problems and support its goals. Previous studies have also shown that digital transformation is positively related to organizational resilience (Saiful et al., 2025). The total effect of digital transformation on digital literacy is positive and significant (β = 0.498, $p < 0.05$; Table 3). Therefore, H2 is accepted. (Pilav-Velić et al., 2021) stated that entrepreneurs with high levels of digital behavior play a more active role in their firms' innovative and opportunity recognition than those with low levels of improvisational behavior.

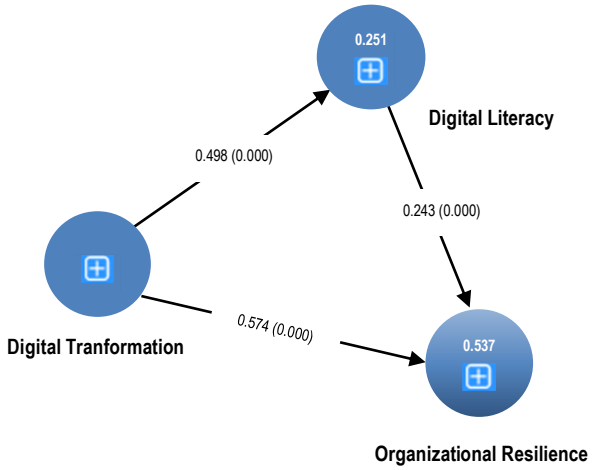

Figure 2. Structural Model
Source: Own Compilation, 2025

Table 4. Direct and Indirect Effects

Indirect Effects	Original sample (O)	Sample mean (M)	Std. dev	Tstatistics (O/Std.dev)	P values
Digital Transformation -> Digital Literacy-> Organization Resilience	0.136	0.129	0.045	3.769	0.000
Direct Effects	Original sample (O)	Sample mean (M)	Std. dev	T statistics (O/Std.dev)	P values
Digital Transformation -> Organizational Resilience	0.574	0.532	0.055	10.723	0.000
Digital Transformation -> Digital Literacy	0.498	0.509	0.053	9.114	0.000
Digital Literacy -> Organization Resilience	0.243	0.258	0.054	4.364	0.000

Source: Own Compilation (2025)

To test the mediating effect of digital literacy, a bootstrapping procedure was employed to examine the indirect effect of digital transformation on organizational resilience via digital literacy. The results show that digital transformation significantly influences digital literacy; digital literacy has a positive and significant effect on organizational resilience, and the indirect effect of digital transformation on organizational resilience through digital literacy is statistically significant (β = 0.136, $p < 0.05$; Table 4). Furthermore, the direct effect of digital transformation on organizational resilience remained significant after including digital literacy in the model, indicating partial

 DOI: https://doi.org/10.61242/ijabo.25.684

mediation. Therefore, H4 is supported, confirming that digital literacy serves as an important mediating mechanism through which digital transformation enhances organizational resilience. This finding provides empirical support for the argument proposed by (Kass-Hanna et al., 2022) that technology investments alone are insufficient to build resilience unless employees possess the necessary capabilities to effectively utilize digital tools .

DISCUSSION

This study aimed to examine how digital transformation contributes to organizational resilience and to elucidate the mediating role of digital literacy in this relationship. Building on the digital transformation and organizational resilience framework proposed by (He et al., 2023), the findings provide both theoretical and practical insights into how technological and human capabilities jointly shape organizational resilience in uncertain environments. First, this study reinforces and extends prior research demonstrating that digital transformation is a critical antecedent of organizational resilience. Consistent with (Bonnet & Westerman, 2021), the findings confirm that organizations with higher levels of digital maturity are better equipped to anticipate disruptions, manage vulnerabilities, and adapt to environmental turbulence. This study strengthens the argument that digital transformation should be viewed not merely as an operational or efficiency-enhancing initiative, but as a strategic capability that underpins organizational survival and long-term sustainability.

By empirically validating the direct effect of digital transformation on organizational resilience, this study contributes to the growing body of literature that positions digital transformation as a foundational capability in volatile, uncertain, complex, and ambiguous (VUCA) environments. Second, a key theoretical contribution of this study lies in identifying digital literacy as a critical micro-foundation of organizational resilience. While (Nurain et al., 2024) emphasize the role of transformation management intensity in empowering employees, their study does not explicitly operationalize employee digital competencies. This research addresses that gap by empirically demonstrating that digital transformation positively influences employees' digital literacy. From a dynamic capabilities perspective, digital transformation can be understood as a higher-order organizational capability that enables the development of lower-order individual capabilities, such as digital literacy (Efawati et al., 2021). As employees engage with digitally transformed processes and technologies, they acquire the skills, confidence, and cognitive flexibility necessary to navigate digital environments (Hinterhuber et al., 2021). These competencies, in turn, strengthen the organization's adaptive capacity during periods of disruption.

The results of this study indicate that digital literacy has a positive and significant effect on organizational resilience, thus supporting the third hypothesis. This finding reinforces the view that digital literacy is a key determinant of an organization's ability to adapt, withstand, and recover from environmental disruptions. Organizations with higher levels of digital literacy are better able to leverage technology to maintain communication, manage information, and adjust business processes quickly during crises (Chaniago, 2023b). Digital literacy also enhances organizational learning and collaboration, contributing to greater agility and innovation (Hasan et al., 2024). Within the framework of the Resource-Based View and Dynamic Capabilities Theory, digital literacy functions as a strategic resource that strengthens the organization's ability to sense, seize, and transform opportunities in changing environments. This result aligns with prior studies showing that digitally competent organizations demonstrate higher

 DOI: https://doi.org/10.61242/ijabo.25.684

resilience when facing disruptions, including during the COVID-19 pandemic (Gao et al., 2023). Therefore, enhancing digital literacy at all organizational levels is a critical strategy to build long-term resilience and ensure sustainability in an increasingly dynamic digital era (Chaniago et al., 2025; Chaniago & Efawati, 2022, 2024). By incorporating digital literacy into the resilience framework, this study shifts the focus from purely structural and technological explanations of resilience toward a more integrative, human-centered perspective.

Third, this study advances theoretical understanding by empirically validating digital literacy as a mediating mechanism between digital transformation and organizational resilience. The mediation results indicate that digital transformation enhances organizational resilience not only directly, but also indirectly through its positive effect on digital literacy. This finding responds directly to the concern raised by (Suryani & Chaniago, 2023) that investments in digital technologies do not automatically translate into enhanced individual capabilities. The results provide empirical evidence that digital literacy functions as a crucial conduit through which digital transformation initiatives are translated into resilient organizational outcomes. By articulating this mediation pathway, the study contributes to the resilience literature by unpacking the "black box" between digital investments and resilience outcomes, thereby offering a more nuanced explanation of how resilience is built in digitally transforming organizations.

Finally, this study contributes to organizational resilience theory by integrating technological and human capital perspectives. Prior resilience research has often focused on either system-level resources or human and social capital. This study demonstrates that organizational resilience emerges from the interaction between digital infrastructure and employee capabilities, rather than from either dimension alone (Efawati, 2020, 2023). This integrative perspective aligns with and extends the dual-source view of resilience proposed by (Mehta et al., 2024) which highlights both systematic control and individual contribution as sources of resilience. By positioning digital literacy as a key individual-level capability shaped by digital transformation, this study offers a more comprehensive and theoretically robust model of organizational resilience in the digital era.

In addition to its theoretical contributions, this study provides several actionable implications for managers and practitioners seeking to enhance organizational resilience through digital transformation. First, the findings suggest that managers should treat digital transformation as a strategic resilience-building initiative, rather than a purely technological upgrade. Investments in digital technologies, digital platforms, and data analytics can significantly strengthen an organization's ability to withstand and adapt to disruptions. However, consistent with the findings of (Carmeli et al., 2021), technology investments alone are insufficient. Organizations must ensure that digital transformation efforts are supported by strong leadership, clear governance, and coordinated implementation across organizational units. Second, the mediating role of digital literacy highlights the importance of continuous investment in employee digital skills development. Managers should prioritize training programs, digital upskilling initiatives, and learning opportunities that enhance employees' ability to effectively use and adapt to digital technologies. Rather than viewing digital literacy as an individual responsibility, organizations should recognize it as a collective capability that strengthens resilience at the organizational level. Encouraging experimentation, providing access to digital tools, and fostering a psychologically safe environment for learning can further enhance employees' digital literacy and adaptive capacity.

Third, the findings underscore the importance of aligning digital transformation initiatives with organizational culture and leadership practices. Transformative leadership that communicates a clear digital vision and supports employee participation is essential

 DOI: https://doi.org/10.61242/ijabo.25.684

for translating digital transformation into meaningful resilience outcomes. Managers should actively involve employees in digital initiatives, encourage cross-functional collaboration, and recognize innovative uses of digital tools in response to emerging challenges. Such practices not only enhance digital literacy but also foster employee engagement and proactive problem-solving during crises. Finally, this study suggests that resilient organizations are built through the synergistic integration of people and technology. Organizations that simultaneously invest in digital infrastructure and human capabilities are better positioned to respond to unexpected disruptions, recover more quickly, and even leverage crises as opportunities for innovation and transformation.

CONCLUSION

This study set out to examine how digital transformation contributes to organizational resilience and to clarify the role of digital literacy as a mediating mechanism in this relationship. Building on and extending the digital transformation of organizational resilience. The findings provide empirical evidence that organizational resilience in the digital era is shaped not only by technological investments and managerial systems but also by employees' digital capabilities. The results demonstrate that digital transformation positively influences digital literacy, indicating that digitally mature organizations create an enabling environment for employees to develop essential digital skills and competencies. In addition, digital transformation is found to have a direct positive effect on organizational resilience, confirming its role as a strategic capability that enhances organizations' ability to anticipate, adapt to, and recover from disruptions. Most importantly, the study reveals that digital literacy partially mediates the relationship between digital transformation and organizational resilience. This finding suggests that digital transformation strengthens resilience not only through structural and technological mechanisms but also by enhancing employees' ability to effectively use and adapt digital technologies in turbulent contexts. By explicitly incorporating digital literacy into the digital transformation resilience nexus, this study advances a more holistic and human-centered understanding of organizational resilience. The findings highlight that resilience emerges from the interaction between digital infrastructure and human capital, rather than from technology alone. As such, this study contributes to the growing literature that views digital transformation as a socio-technical process with profound implications for organizational adaptability and long-term sustainability. Despite its contributions, this study is subject to several limitations that should be acknowledged.

First, the study employs a cross-sectional research design, which limits the ability to make strong causal inferences. Although the hypothesized relationships are theoretically grounded and empirically supported, the dynamic and evolving nature of digital transformation and resilience suggests that these relationships may change over time. Longitudinal designs would allow future studies to capture the temporal development of digital literacy and organizational resilience more accurately. Second, the data are based on self-reported measures collected from employees, which may introduce common method bias and perceptual subjectivity. Although procedural and statistical remedies were applied to mitigate this concern, future research could strengthen validity by incorporating objective indicators, such as digital investment data or archival performance measures. Third, the sample focuses on service-oriented organizations, which may limit the generalizability of the findings to other sectors. While service organizations are particularly relevant contexts for studying resilience due to their vulnerability to external disruptions, manufacturing, public sector, and high-technology industries may exhibit different digital transformation dynamics. Finally, digital

 DOI: https://doi.org/10.61242/ijabo.25.684

transformation was operationalized using the digital maturity. Although this approach is well-established and empirically validated, it may not fully capture emerging forms of digital transformation driven by advanced technologies such as artificial intelligence, big data analytics, or platform ecosystems.

Building on the limitations of this study, several avenues for future research are proposed. First, future studies could adopt longitudinal or panel data designs to examine how digital transformation, digital literacy, and organizational resilience co-evolve over time. Such approaches would provide deeper insights into the causal mechanisms and dynamic capabilities underlying resilience in digitally transforming organizations. Second, future research could explore additional mediators and moderators that may influence the digital transformation resilience relationship. For instance, leadership styles, digital culture, psychological safety, or organizational learning may interact with digital literacy to further explain how resilience is developed at both individual and organizational levels. Third, comparative studies across different industries or national contexts would enhance the external validity of the findings. Examining how institutional environments, regulatory frameworks, or cultural factors shape the role of digital literacy in resilience building would provide valuable cross-contextual insights. Fourth, future research could disaggregate digital literacy into multiple dimensions, such as technical, cognitive, and social digital competencies, to examine whether specific aspects of digital literacy are more critical for different dimensions of organizational resilience. Finally, qualitative or mixed-method approaches could complement quantitative findings by offering rich insights into how employees and managers experience digital transformation and develop resilience in practice. Such approaches would help uncover nuanced processes that are difficult to capture through survey data alone.

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