

Exploring the Role of Digital Literacy in Mitigating Technostress among Indonesian SMEs

Mudrifah^{1*}, Yufi Priyo Sutanto², Edial Nanang Setiawan³

^{1,2,3}Department of Management, Universitas Islam Blitar, Blitar, Indonesia

Corresponding Author: Mudrifah mudrifah@unisbablitar.ac.id

ARTICLE INFO

Keywords: Digital Literacy; Technostress; Digital Transformation; SMEs; Adaptive Coping; Qualitative Research.

Received : 21 January

Revised : 23 February

Accepted: 23 March

©2026 Mudrifah, Sutanto, Setiawan:

This is an open-access article distributed under the terms of the [Creative Commons Atribusi 4.0 Internasional](https://creativecommons.org/licenses/by/4.0/).



ABSTRACT

Digital transformation has created both opportunities and psychological challenges for small and medium-sized enterprises (SMEs), particularly technostress arising from rapid technological change. This study explores how digital literacy shapes SME owners' experiences of technostress during digital transformation. Using a qualitative phenomenological approach, in-depth interviews were conducted with eight SME owners in East Java, Indonesia, and analyzed using the Miles and Huberman interactive model. The findings revealed four interrelated themes: (1) digital literacy develops through continuous learning, (2) technostress emerges from technology complexity, information overload, digital risks, and continuous system changes, (3) digital literacy functions as a protective capability by strengthening confidence, problem-solving ability, adaptability, and resilience, and (4) adaptive coping strategies, including social support, self-directed learning, selective technology adoption, and a positive mindset, facilitate sustainable digital transformation. Based on these findings, this study proposes the Digital Literacy and Technostress Adaptation Framework, highlighting digital literacy as a dynamic capability that enhances psychological resilience and supports sustainable digital transformation among SMEs.

INTRODUCTION

Digital transformation has become an inevitable process for small and medium-sized enterprises (SMEs) seeking to improve competitiveness, operational efficiency, and market reach. The rapid adoption of digital technologies, including e-commerce platforms, digital payment systems, cloud-based applications, and social media marketing, has significantly reshaped how SMEs conduct business (Ciarli, Kenney, Massini, & Piscitello, 2021; Tarafdar, Maier, Laumer, & Weitzel, 2020; Zamani, 2022). While digitalization offers substantial opportunities for growth, many SMEs continue to experience difficulties in adapting to increasingly complex digital environments. One of the critical factors influencing successful digital transformation is digital literacy. Digital literacy extends beyond the ability to operate digital devices; it encompasses the knowledge, skills, and confidence required to access, evaluate, create, and communicate information through digital technologies (Shatila & Hernández-Lara, 2026). SME owners and employees with adequate digital literacy are generally more capable of adapting to technological changes and utilizing digital tools effectively. Conversely, limited digital literacy often creates barriers that hinder digital adoption and organizational development. The rapid introduction of digital technologies also generates new psychological challenges. Many SME owners report feelings of pressure, anxiety, frustration, and fatigue when facing continuous technological changes, multiple digital platforms, and increasing demands for digital competence (Gaia, 2026). These conditions are commonly referred to as technostress, a phenomenon describing the stress experienced by individuals due to their inability to cope effectively with information and communication technologies. Technostress may reduce work motivation, decision-making quality, and overall business performance, particularly among SMEs with limited human and technological resources (Diar, Chamalinda, Rohma, & Hakim, 2026; Lasrado, Panakaje, & Parvin, 2026).

Previous studies have primarily examined digital literacy and technostress using quantitative approaches, focusing on statistical relationships among variables (Jonathan, Caroline, Kornarius, Hendarta, & Gunawan, 2025; Utari & Singagerda, 2026). Although these studies provide valuable empirical evidence, they offer limited understanding of how SME owners actually experience technological changes, interpret digital challenges, and develop coping strategies in their daily business activities. The subjective experiences behind the emergence of technostress remain underexplored, especially within the context of Indonesian SMEs, where digital capabilities and business characteristics vary considerably. Addressing this gap requires a qualitative perspective that allows researchers to explore participants' lived experiences in greater depth. Through in-depth interviews and thematic analysis following the Miles and Huberman (1984) framework, this study seeks to understand how digital literacy shapes the experiences of technostress among Indonesian SME owners. Rather than testing causal relationships, the study aims to uncover patterns, meanings, and contextual factors that explain why some entrepreneurs successfully adapt to digital transformation while others continue to struggle. This study is expected to contribute to the growing

literature on digital transformation by providing a richer understanding of the interaction between digital literacy and technostress in SMEs. The findings may also offer practical insights for policymakers, educational institutions, and SME development agencies in designing digital capacity-building programs that not only improve technological competence but also reduce psychological barriers during digital transformation.

LITERATURE REVIEW

Digital Literacy

Digital literacy refers to an individual's ability to access, evaluate, understand, and effectively utilize digital technologies to accomplish personal and professional objectives (Hussain & Phulpoto, 2024). Beyond technical competence, digital literacy encompasses critical thinking, communication, problem-solving, and the capacity to adapt to rapidly evolving digital environments (Vuorikari, Jerzak, Karpinski, Pokropek, & Tudek, 2022). From the perspective of the Digital Competence Framework (DigComp), digital literacy represents a multidimensional capability that enables individuals to continuously learn, collaborate, and respond to technological changes. In the context of SMEs, digital literacy supports business owners in integrating digital technologies into daily operations, improving decision-making, fostering innovation, and enhancing organizational competitiveness (OECD, 2021). Consequently, based on UNESCO 2023, digital literacy has been recognized as a strategic capability that strengthens organizational resilience and facilitates successful digital transformation in an increasingly dynamic business environment (Van Laar, Van Deursen, Van Dijk, & De Haan, 2020).

Technostress

Technostress refers to the psychological strain experienced by individuals when they are unable to effectively cope with the demands associated with information and communication technologies (Tarafdar et al., 2020). Rooted in the Job Demands-Resources Theory (Bakker & Demerouti, 2014), technostress occurs when technological demands exceed an individual's knowledge, skills, or available resources, resulting in anxiety, frustration, mental fatigue, information overload, and reduced work satisfaction. Within SMEs, technostress may stem from continuous software updates, increasing digital platform complexity, cybersecurity concerns, and growing customer expectations for rapid online services. If not properly managed, prolonged technostress can undermine entrepreneurs' well-being, reduce productivity, and hinder successful digital transformation.

Digital Literacy and Technostress

Previous studies have consistently reported that digital literacy plays a significant role in reducing technostress by enhancing individuals' confidence and competence in utilizing digital technologies. For example, Van Laar et al. (2020) found that stronger digital skills enable individuals to better adapt to technological changes and perform more effectively in digital workplaces. Similarly, Tarafdar et al. (2020) argued that adequate technological competence reduces the negative psychological effects associated with technology

complexity, information overload, and continuous digital connectivity. Recent evidence also indicates that individuals with higher digital literacy demonstrate greater digital resilience and are more capable of managing technological uncertainty during organizational digital transformation (Vuorikari et al., 2022). Despite these findings, existing research has predominantly employed quantitative approaches to examine the relationship between digital literacy and technostress through statistical models (Pindek, Zhou, Kessler, Krajcevska, & Spector, 2021; Tarafdar et al., 2020). While these studies provide valuable empirical evidence, they offer limited understanding of how SME owners personally experience technological challenges, interpret digital demands, and develop adaptive coping strategies throughout their digital transformation journey. Given the unique resource constraints and technological contexts of SMEs, a qualitative inquiry is needed to uncover the underlying processes and contextual factors shaping the relationship between digital literacy and technostress.

Research Questions

RQ1.

How do Indonesian SME owners perceive digital literacy in supporting their business activities?

RQ2.

How do Indonesian SME owners experience technostress during digital transformation?

RQ3.

How does digital literacy influence the emergence and management of technostress among Indonesian SME owners?

METHODOLOGY

Research Design

This study employed a qualitative research approach using a phenomenological design to explore the lived experiences of Small and Medium-sized Enterprise (SME) owners regarding digital literacy and technostress during digital transformation. A qualitative approach was considered appropriate because the study aimed to understand participants' perceptions, experiences, and meanings rather than testing causal relationships between variables (Maxwell, 2021). Through in-depth exploration, the research sought to reveal how digital literacy shapes SME owners' responses to technological challenges in their daily business operations. The study adopted an interpretivist paradigm, which assumes that reality is socially constructed through individuals' experiences and interactions (Pervin & Mokhtar, 2022). Therefore, participants' narratives became the primary source for understanding the phenomenon of technostress within the context of SME digitalization.

Research Setting and Participants

The research was conducted among SMEs operating in East Java, Indonesia. East Java was selected because it has experienced rapid digital transformation, supported by increasing adoption of e-commerce, digital payment systems, online marketing, and cloud-based business applications. Participants were selected using purposive sampling. This technique enabled the researcher to identify information-rich participants who possessed direct experience with digital technologies. The inclusion criteria were: (1) SME owners or managers. (2) Operating the business for at least two years. (3) Using digital technologies in daily business activities (e.g., e-commerce platforms, digital payment systems, social media marketing, accounting software, or online marketplaces). (4) Willing to participate voluntarily. Approximately 8-10 participants were interviewed. Participant recruitment continued until data saturation was achieved, meaning that no substantially new information emerged from subsequent interviews.

Data Collection

Primary data were collected through semi-structured in-depth interviews conducted between August and September 2026. Each interview lasted approximately 45–60 minutes and was conducted either face-to-face or through online meeting platforms, depending on participants' availability. The interview protocol was developed based on the literature on digital literacy and technostress. Open-ended questions allowed participants to describe their experiences freely while enabling the researcher to probe for deeper explanations. Examples of guiding questions included: (1) How do you use digital technology in your business? (2) What challenges have you experienced while learning digital technologies? (3) Have digital technologies ever caused stress or frustration? (4) How do you usually overcome technological difficulties? (5) What kinds of support help you adapt to digital transformation? With participants' permission, all interviews were audio-recorded and subsequently transcribed verbatim to ensure data accuracy.

Data Analysis

The interview data were analyzed using the interactive model developed by Miles, Huberman, and Saldana (2014). Data analysis was conducted continuously throughout the research process, allowing preliminary findings to inform subsequent interviews. The analysis consisted of four interconnected stages.

Data Collection

The first stage involved collecting rich qualitative data through in-depth interviews. During interviews, the researcher also recorded field notes regarding participants' expressions, attitudes, and contextual information.

Data Condensation

After transcription, the researcher carefully reviewed all interview transcripts and identified meaningful statements related to digital literacy and technostress. Similar statements were grouped into initial codes, and irrelevant information was excluded. These codes were then categorized into broader concepts representing participants' shared experiences.

Data Display

The categorized data were organized into thematic matrices and narrative summaries. Data display facilitated comparison across participants, enabling the researcher to identify recurring patterns, similarities, and differences. Representative quotations were selected to support each emerging theme.

Conclusion Drawing and Verification

Finally, the researcher interpreted the relationships among themes to construct an overall understanding of how digital literacy influences technostress among SME owners. Throughout the analysis, conclusions were continuously verified by revisiting the raw interview data and comparing interpretations across participants to ensure consistency and credibility.

Trustworthiness

To ensure the rigor of the qualitative findings, four criteria proposed by Guba and Lincoln (1994) were applied.

Credibility

Credibility was established through prolonged engagement with participants, member checking, and triangulation of interview data with field observations.

Transferability

Detailed descriptions of the research context, participant characteristics, and data collection procedures were provided to enable readers to assess the applicability of the findings to similar contexts.

Dependability

The researcher maintained a comprehensive audit trail documenting interview procedures, coding decisions, analytical processes, and theme development throughout the study.

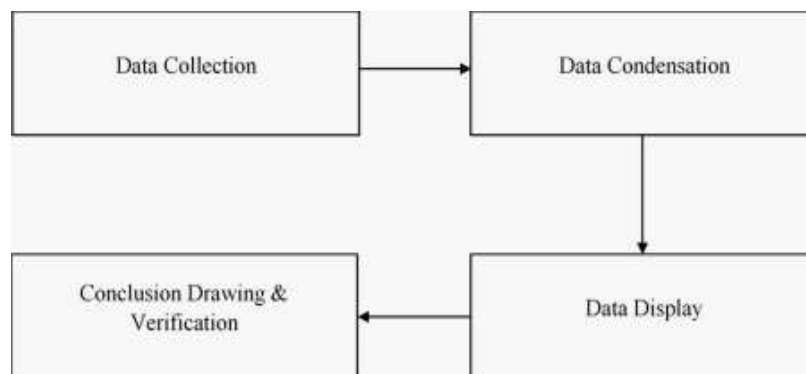
Confirmability

Research findings were grounded in participants' narratives rather than researcher assumptions. Reflexive notes were maintained throughout the research process to minimize subjective bias.

Ethical Considerations

Prior to data collection, all participants received an explanation regarding the objectives of the study, interview procedures, voluntary participation, confidentiality, and the right to withdraw at any stage without consequence. Written informed consent was obtained before each interview commenced. To protect participants' privacy, all names were replaced with participant codes (e.g., P1, P2, P3), and interview recordings and transcripts were stored securely for research purposes only.

Figure 1. Interactive Model of Qualitative Data Analysis (Miles, Huberman, & Saldaña, 2014)



(Continuous Interactive Process)

Source: Adapted from Miles, Huberman, and Saldaña (2014)

RESEARCH RESULT AND DISCUSSION

Overview of the Findings

This study explored how digital literacy shapes the experiences of technostress among Indonesian SME owners during digital transformation. Following the completion of the interview process, all interview recordings were transcribed verbatim, producing approximately 140 pages of textual data. The transcripts were analyzed using the interactive model proposed by (Miles et al., 2014), consisting of data condensation, data display, and conclusion drawing and verification. The analytical process began with repeated reading of the interview transcripts to gain a comprehensive understanding of participants' experiences. During the first cycle of coding, 57 initial codes were identified from meaningful statements expressed by the participants. These codes represented various experiences related to learning digital technology, adapting to digital business environments, psychological responses toward technological changes, and strategies employed to cope with technology-related challenges. The initial codes were subsequently grouped into conceptually similar categories through an iterative coding process. As the analysis progressed, overlapping categories were merged and refined into broader conceptual groups. This process resulted in sixteen categories that captured the essential characteristics of participants' experiences. Finally, four overarching themes emerged, representing the central findings of this study.

The four themes consisted of (1) Digital literacy develops through continuous learning, (2) Technostress emerges from rapid technological change, (3) Digital literacy functions as a protective capability against technostress, and (4) Adaptive coping strategies facilitate successful digital transformation. Together, these themes illustrate that digital literacy is not merely a technical competence but an evolving capability that enables SME owners to adapt to increasingly dynamic digital environments while minimizing psychological strain. The findings further demonstrate that participants experienced digital transformation as a continuous learning journey rather than a one-time

organizational change. Although digital technologies created new business opportunities, they simultaneously generated feelings of uncertainty, information overload, and anxiety. Participants consistently emphasized that their ability to learn, experiment, and seek support from peers significantly reduced these negative experiences. The following sections present each theme in detail, supported by participants' quotations and interpreted within the context of existing literature.

Participant Characteristics

A total of twelve SME owners participated in this study. Data collection ceased after the twelfth interview because thematic saturation had been achieved, as subsequent interviews yielded no substantially new insights regarding digital literacy and technostress. The participants represented diverse business sectors, enabling the study to capture a broad range of experiences associated with digital transformation in Indonesian SMEs. Most participants had operated their businesses for more than five years and had adopted various digital technologies to support business operations. The technologies most frequently used included QRIS digital payment systems, e-commerce platforms such as Shopee and Tokopedia, WhatsApp Business, Instagram, TikTok Shop, point-of-sale (POS) applications, and cloud-based accounting software. Despite differences in business size and industry, participants reported facing relatively similar challenges during the digitalization process. Table 1 presents the demographic profile of the participants involved in this study.

Table 1. Profile of Participants

Participant	Gender	Age	Business Sector	Business Experience	Digital Technologies Used
P1	Female	42	Food and Beverage	8 years	QRIS, ShopeeFood, WhatsApp Business
P2	Male	35	Fashion	6 years	Shopee, Instagram
P3	Female	39	Grocery Store	10 years	Marketplace, Digital Payment
P4	Male	31	Coffee Shop	4 years	POS System, QRIS
P5	Female	45	Bakery	12 years	Facebook Marketplace
P6	Male	29	Printing Service	5 years	Canva, Instagram
P7	Female	37	Handicraft	9 years	TikTok Shop, Shopee
P8	Male	41	Furniture	15 years	WhatsApp Business

Participants varied in age, business sector, and digital experience. Younger entrepreneurs were generally more familiar with digital technologies, whereas older business owners relied more on self-learning and support from family or employees. Regardless of these differences, all participants recognized digital technologies as essential for business competitiveness. This diversity provided rich insights into the development of digital literacy, the experience of technostress, and SMEs' adaptation to digital transformation.

Data Condensation and Coding Process

Following data collection, all interviews were transcribed verbatim and analyzed using the interactive model of Miles and Huberman (2014), with data collection and analysis conducted iteratively. During data condensation, meaningful statements related to digital literacy, technostress, and adaptation were identified and coded. Open coding generated 57 initial codes, which were subsequently refined through axial and selective coding into 16 analytical categories and four overarching themes. These themes provided the basis for explaining how digital literacy shapes SME owners' experiences of technostress during digital transformation.

Table 2. Example of Coding Process

Interview Excerpt	Open Code	Category	Theme
"I learned everything from YouTube because I never attended formal digital training." (P7)	Self-learning	Informal Digital Learning	Digital Literacy Develops through Continuous Learning
"Whenever the application is updated, I have to learn everything again." (P4)	Frequent system updates	Technology Complexity	Technostress Emerges from Rapid Technological Change
"Sometimes I worry about making mistakes when customers transfer money." (P5)	Fear of digital errors	Psychological Pressure	Technostress Emerges from Rapid Technological Change
"Now I am more confident because I already understand how the application works." (P3)	Increased confidence	Digital Self-Efficacy	Digital Literacy Functions as a Protective Capability
"If I don't understand something, I ask my son or younger employees." (P8)	Seeking assistance	Social Support	Adaptive Coping Strategies
"I only use applications that are truly necessary for my business." (P2)	Selective technology adoption	Simplification Strategy	Adaptive Coping Strategies

The coding process revealed a consistent pattern across participants. Initially, digital technologies were perceived as complex and intimidating. However, continuous learning and experience gradually increased participants' confidence, indicating that digital literacy is a dynamic capability developed through practice and social interaction. The coded data were then organized into thematic matrices to identify recurring patterns and form the four major themes presented in the following sections.

Table 3. Summary of Emergent Themes

Theme	Categories	Main Findings
Theme 1. Digital Literacy Develops through Continuous Learning	Informal learning, self-directed learning, peer learning, experiential learning	Digital literacy is acquired gradually through continuous practice rather than formal education alone.
Theme 2. Technostress Emerges from Rapid Technological Change	Technology complexity, information overload, fear of digital errors, continuous updates	Technostress arises from increasing technological demands and uncertainty in digital business environments.
Theme 3. Digital Literacy Functions as a Protective Capability	Digital confidence, self-efficacy, problem-solving ability, digital resilience	Improved digital literacy enhances confidence and reduces psychological strain associated with technology use.
Theme 4. Adaptive Coping Strategies Facilitate Digital Transformation	Social support, online learning, selective technology adoption, continuous adaptation	SME owners employ various coping strategies to manage technostress and sustain digital transformation.

Theme 1: Digital Literacy Develops Through Continuous Learning

Digital literacy emerged as a dynamic capability developed through continuous learning rather than formal education. Participants viewed digital literacy as the confidence and willingness to learn technologies that support business needs. Three subthemes were identified: learning by doing, self-directed learning, and social learning. Learning by doing occurred through repeated use of digital applications, allowing participants to gain confidence and solve problems through trial and error. Self-directed learning was primarily supported by YouTube tutorials, online forums, and social media, enabling flexible and business-oriented learning. Social learning occurred through family members, employees, and fellow entrepreneurs who shared practical digital knowledge. Overall, digital literacy evolved through continuous experience, independent learning, and collaborative interaction rather than structured training. The findings suggest that digital literacy is an evolving adaptive capability rather than a fixed technical skill. Driven by business demands, SME owners continuously acquire digital competencies through experience, self-learning, and social interaction. This capability forms the foundation for managing technological change and prepares entrepreneurs to cope with technostress during digital transformation.

Theme 2: Technostress Emerges from Rapid Technological Change

Participants consistently described digital transformation as a source of psychological pressure despite its business benefits. Technostress resulted not only from limited technological skills but also from the rapid pace and complexity of digital change. Four subthemes emerged: technology complexity, information overload, fear of digital errors, and continuous technological change. Managing multiple digital platforms created confusion and increased cognitive demands. Continuous notifications and customer communications generated information overload, making it difficult to separate work from personal life. Participants also expressed anxiety about financial mistakes, cybersecurity risks, and data security. Frequent software updates and changing digital systems further intensified uncertainty by requiring constant adaptation. Technostress is a multidimensional consequence of digital transformation, arising from technological complexity, excessive information, perceived business risks, and continuous system changes. These interconnected pressures suggest that reducing technostress requires not only technical competence but also adaptive capabilities that help entrepreneurs manage uncertainty and ongoing technological change.

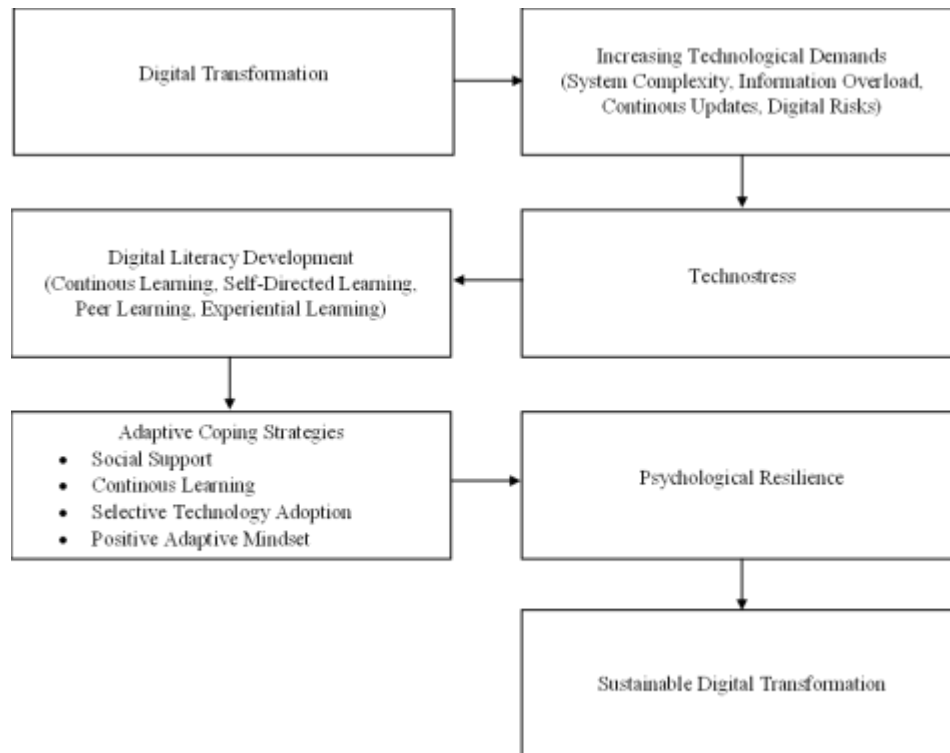
Theme 3: Digital Literacy Functions as a Protective Capability Against Technostress

Although participants experienced technostress during digital transformation, improved digital literacy gradually reduced its psychological impact. Rather than eliminating technological challenges, digital literacy strengthened confidence and adaptive capacity. Four subthemes emerged: developing confidence, independent problem-solving, adaptability to technological change, and psychological resilience. Participants became more confident after repeated digital experiences, relied less on external assistance, and increasingly solved technological problems independently. They also viewed technological change as a normal aspect of business and developed greater resilience by treating digital challenges as manageable learning opportunities. The findings demonstrate that digital literacy serves as a protective capability by increasing confidence, strengthening problem-solving skills, improving adaptability, and fostering resilience. Rather than reducing technological demands, digital literacy changes how entrepreneurs interpret and respond to them, enabling more proactive and less stressful engagement with digital transformation.

Theme 4: Adaptive Coping Strategies Facilitate Digital Transformation

Participants actively developed coping strategies to manage technostress instead of avoiding digital technologies. Four strategies emerged: seeking social support, continuous self-learning, selective technology adoption, and maintaining a positive adaptive mindset. Family members, employees, and entrepreneurial communities provided practical support in overcoming technological difficulties. Participants also continuously updated their knowledge through online resources, selectively adopted technologies that generated business value, and maintained a positive attitude toward ongoing technological change. These strategies enabled entrepreneurs to sustain digital transformation despite persistent technological challenges. Adaptive coping strategies play a central role in sustaining digital transformation. Social support, continuous learning, selective technology adoption, and a positive mindset reduce psychological pressure while strengthening resilience and long-term digital capability. Together, these strategies allow SME owners to remain competitive in rapidly evolving digital environments. Consequently, this study conceptualizes digital literacy as a dynamic strategic capability that enables SME owners to navigate digital transformation while minimizing the psychological burden associated with technological change.

Figure 3. The Digital Literacy–Technostress Adaptation Framework



The proposed framework highlights that digital literacy does not simply reduce technostress directly. Instead, digital literacy strengthens entrepreneurs' adaptive capacity, enabling them to develop effective coping mechanisms that transform technological pressure into opportunities for learning and business improvement. This perspective extends previous studies by positioning digital literacy as an evolving capability that supports both technological adaptation and psychological resilience throughout the digital transformation process.

General Discussion

The findings of this study provide a deeper understanding of how SME owners experience digital transformation beyond the technological perspective that dominates previous research. While earlier studies have primarily emphasized digital literacy as a determinant of technology adoption, the present study demonstrates that digital literacy also plays a significant psychological role in reducing technostress and strengthening entrepreneurs' adaptive capacity. The first important finding concerns the developmental nature of digital literacy. Participants consistently described digital literacy as a lifelong learning process rather than a competency acquired through formal education alone. Learning occurred primarily through practical experience, independent exploration, and interactions with family members, employees, and entrepreneurial communities (Hamilton, 2011; Malik, Abrar, & Hina, 2025). This finding suggests that digital literacy should be understood as an evolving capability that continuously develops alongside technological change. The second finding demonstrates that technostress among SME owners originates from multiple interconnected sources. Participants experienced stress not

simply because they lacked technological skills, but because they operated within rapidly changing digital environments characterized by increasing technological complexity, excessive information, continuous software updates, and perceived business risks. These findings indicate that technostress represents a multidimensional phenomenon requiring both technical and psychological adaptation.

Another significant contribution of this study is the identification of digital literacy as a protective capability. As participants accumulated digital knowledge and practical experience, they gradually became more confident in managing technological challenges. Increased confidence strengthened their ability to solve problems independently, adapt to technological change, and remain psychologically resilient despite continuous digital disruption. Consequently, digital literacy should be viewed not only as a technological competency but also as an important personal resource supporting entrepreneurs' psychological well-being (Lasrado et al., 2026). The findings further reveal that successful digital transformation depends heavily on entrepreneurs' adaptive coping strategies. Rather than attempting to eliminate technological challenges, participants actively developed mechanisms to manage them. Seeking social support, engaging in continuous self-learning, selectively adopting technologies, and maintaining a positive mindset enabled participants to sustain digital transformation while minimizing the negative effects of technostress. These findings suggest that digital transformation is fundamentally a process of continuous adaptation rather than merely technological implementation.

Overall, this study contributes to the growing literature on SME digital transformation by proposing the Digital Literacy and Technostress Adaptation Framework (Andika, 2026), which explains how digital literacy enhances adaptive coping strategies and psychological resilience during digital transformation. Unlike previous quantitative studies that largely focus on statistical relationships between variables, the present research offers a process-oriented explanation of how entrepreneurs experience, interpret, and respond to technological change within their everyday business activities. The framework therefore provides a richer theoretical understanding of the interaction between digital literacy and technostress while offering practical insights for designing digital capability development programs for SMEs.

CONCLUSIONS AND RECOMMENDATIONS

This study explored how digital literacy shapes the experiences of technostress among Indonesian SME owners during digital transformation. Using a qualitative phenomenological approach and the interactive analysis model of Miles and Huberman, the study revealed that digital literacy is not merely a technical competency but an adaptive capability that evolves through continuous learning and practical experience. Four major themes emerged from the findings. First, digital literacy develops through continuous learning, where SME owners acquire digital competencies through experiential learning, self-directed learning, and social interactions with family members, employees, and business communities. Rather than depending on formal training programs, participants primarily relied on practical experience to improve their digital capabilities.

Second, technostress emerged as a multidimensional phenomenon resulting from technology complexity, information overload, fear of digital errors, and continuous technological change. These challenges generated psychological pressure that affected participants' confidence, work routines, and business decision-making. The findings demonstrate that technostress is not solely caused by insufficient digital skills but also by the rapidly evolving nature of digital business environments.

Third, digital literacy functions as a protective capability that enables SME owners to reduce the psychological burden associated with digital transformation. As participants gained digital knowledge and experience, they became more confident, developed stronger problem-solving abilities, adapted more easily to technological change, and demonstrated greater psychological resilience. Finally, the study found that SME owners actively developed adaptive coping strategies to manage technostress. Seeking social support, engaging in continuous self-learning, selectively adopting digital technologies, and maintaining a positive adaptive mindset enabled participants to sustain digital transformation despite ongoing technological challenges. These coping strategies transformed technology-related stress into opportunities for learning and business improvement.

Overall, this study proposes the Digital Literacy and Technostress Adaptation Framework, illustrating that digital literacy strengthens adaptive coping strategies and psychological resilience, thereby supporting sustainable digital transformation among SMEs.

Theoretical Implications

The present study contributes to the growing literature on digital transformation and SME management in several important ways.

First, the findings broaden the conceptualization of digital literacy. Previous studies have generally viewed digital literacy as an individual's ability to use digital technologies effectively. The present findings suggest that digital literacy should instead be understood as a dynamic capability that continuously develops through experience, reflection, and social interaction. This perspective emphasizes that digital literacy extends beyond technical competence to include confidence, adaptability, and continuous learning. Second, this study enriches the understanding of technostress by demonstrating that psychological

pressure experienced by SME owners originates from multiple interconnected factors rather than technological complexity alone. Information overload, digital uncertainty, perceived business risks, and continuous technological updates jointly contribute to the emergence of technostress. Third, the proposed Digital Literacy–Technostress Adaptation Framework provides a process-oriented explanation of how SME owners adapt to digital transformation. Rather than portraying digital literacy as a direct antecedent of reduced technostress, the framework highlights the mediating role of adaptive coping strategies and psychological resilience. This process perspective offers a richer theoretical explanation than the linear relationships commonly examined in quantitative research.

Practical Implications

The findings also provide several practical implications for policymakers, SME development agencies, educational institutions, and business practitioners. Government agencies responsible for SME development should complement digital infrastructure initiatives with continuous digital capability development programs. Rather than focusing exclusively on technical training, future programs should encourage experiential learning, peer mentoring, and collaborative learning communities that enable entrepreneurs to continuously improve their digital competencies. Business associations may also facilitate knowledge-sharing networks where experienced entrepreneurs exchange practical solutions for managing digital technologies. Such collaborative environments can reduce technological uncertainty while strengthening entrepreneurs' confidence.

Furthermore, technology developers should design digital business applications that are more user-friendly and responsive to the needs of SME owners. Simplifying interfaces, improving customer support, and providing accessible learning resources may reduce technology complexity and minimize technostress. Finally, SME owners themselves should recognize that digital transformation is a continuous learning journey. Developing a learning orientation, seeking support from professional networks, and selectively adopting technologies according to business needs may improve digital adaptation while reducing psychological strain.

Limitations and Future Research

Despite providing valuable insights, this study has several limitations. First, the study involved only eight SME owners located in East Java, Indonesia. Although data saturation was achieved, the findings should not be interpreted as statistically representative of all Indonesian SMEs. Second, the research focused exclusively on SME owners. Future studies may incorporate employees, digital consultants, government officers, or technology providers to obtain a broader understanding of digital transformation experiences. Third, the findings reflect participants' perceptions at a particular point in time. Because digital transformation is an evolving process, longitudinal qualitative studies may provide deeper insights into how digital literacy and technostress develop over time. Finally, the proposed conceptual framework has not been empirically tested using quantitative methods. Consequently, future research

may examine the relationships among digital literacy, adaptive coping strategies, technostress, and organizational outcomes using larger samples and structural equation modeling.

Future studies should extend the proposed Digital Literacy–Technostress Adaptation Framework across different industrial sectors, organizational sizes, and national contexts. Comparative studies involving manufacturing, service industries, creative enterprises, and family-owned businesses may reveal contextual differences in digital adaptation. Researchers may also investigate additional factors that strengthen or weaken the relationship between digital literacy and technostress, such as organizational support, digital leadership, innovation culture, psychological capital, or technology self-efficacy. Another promising direction involves employing mixed-method or longitudinal research designs to examine how entrepreneurs' digital competencies evolve throughout different stages of digital transformation. Such studies would complement the present findings by integrating rich qualitative insights with broader quantitative evidence. Overall, continued investigation into the psychological dimensions of digital transformation will contribute to a more comprehensive understanding of how SMEs can successfully adapt to increasingly dynamic digital environments while maintaining both business sustainability and entrepreneur well-being.

REFERENCES

- Andika, A. (2026). Digital Literacy and Self-Efficacy Development Strategies for Technostress Coping Among Older Lecturers in Higher Education Institutions. *Jurnal Rumpun Manajemen Dan Ekonomi*, 3(1), 191-199.
- Bakker, A. B., & Demerouti, E. (2014). Job demands–resources theory. *Wellbeing: A complete reference guide*, 1-28.
- Ciarli, T., Kenney, M., Massini, S., & Piscitello, L. (2021). Digital technologies, innovation, and skills: Emerging trajectories and challenges. *Research Policy*, 50(7), 104289.
- Diar, C. F. B., Chamalinda, K. s. N. L., Rohma, F. F., & Hakim, T. I. R. (2026). Pengaruh Technostress terhadap Peningkatan Kinerja Industri Halal: Peran Moderator Self-Efficacy. *Wacana Equiliberium (Jurnal Pemikiran Penelitian Ekonomi)*, 14(01), 15-32.
- Gaia, Z. (2026). Preventing employee burnout: causes, recognition, solutions, and best practices in European SMEs.
- Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. *Handbook of qualitative research*, 2(163-194), 105.

- Hamilton, E. (2011). Entrepreneurial learning in family business: A situated learning perspective. *Journal of Small Business and Enterprise Development*, 18(1), 8-26.
- Hussain, N., & Phulpoto, S. (2024). Digital literacy: Empowering individuals in the Digital Age. *Assyfa Learning Journal*, 2(2), 70-83.
- Jonathan, P., Caroline, A., Kornarius, Y. P., Hendarta, A. I., & Gunawan, A. (2025). Literasi digital, technostress, dan adopsi teknologi Industri 4.0: Pendorong kinerja inovasi. *Jurnal Manajemen Maranatha*, 25(1), 1-20.
- Lasrado, B. S., Panakaje, N., & Parvin, S. R. (2026). Untangling techno-stress and entrepreneurial burnout: the conditional role of digital competence and social support as coping mechanisms in rural entrepreneurship. *Journal of Small Business and Enterprise Development*, 33(3), 766-788.
- Malik, F., Abrar, A., & Hina, M. (2025). Entrepreneurial learning behaviours within the social context: an exploratory study of technology startups in Pakistan. *Journal of Entrepreneurship in Emerging Economies*, 17(6), 1357-1378.
- Maxwell, J. A. (2021). The importance of qualitative research for investigating causation. *Qualitative Psychology*, 8(3), 378.
- Miles, M. B., & Huberman, A. M. (1984). Drawing valid meaning from qualitative data: Toward a shared craft. *Educational researcher*, 13(5), 20-30.
- Miles, M. B., Huberman, A. M., & Saldana, J. (2014). *Qualitative data analysis: sage*.
- Pervin, N., & Mokhtar, M. (2022). The interpretivist research paradigm: A subjective notion of a social context. *International Journal of Academic Research in Progressive Education and Development*, 11(2), 419-428.
- Pindek, S., Zhou, Z. E., Kessler, S. R., Krajcevska, A., & Spector, P. E. (2021). Workdays are not created equal: Job satisfaction and job stressors across the workweek. *Human Relations*, 74(9), 1447-1472.

- Shatila, K., & Hernández-Lara, A. B. (2026). From digital literacy to Innovation 5.0: the strategic role of agility in enhancing entrepreneurial success. *Journal of Entrepreneurship in Emerging Economies*, 1-26.
- Tarafdar, M., Maier, C., Laumer, S., & Weitzel, T. (2020). Explaining the link between technostress and technology addiction for social networking sites: A study of distraction as a coping behavior. *Information Systems Journal*, 30(1), 96-124.
- Utari, B., & Singagerda, F. S. (2026). Digital Fluency as a Missing Mechanism in Government Digital Transformation: Linking Digital Literacy, Technostress, and Employee Performance. *International Journal of Economics, Business, and Entrepreneurship*, 9(1), 32-44.
- Van Laar, E., Van Deursen, A. J., Van Dijk, J. A., & De Haan, J. (2020). Determinants of 21st-century skills and 21st-century digital skills for workers: A systematic literature review. *Sage Open*, 10(1), 2158244019900176.
- Vuorikari, R., Jerzak, N., Karpinski, Z., Pokropek, A., & Tudek, J. (2022). Measuring digital skills across the EU: Digital skills indicator 2.0.
- Zamani, S. Z. (2022). Small and Medium Enterprises (SMEs) facing an evolving technological era: a systematic literature review on the adoption of technologies in SMEs. *European Journal of Innovation Management*, 25(6), 735-757.