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Determinant of Digital Transformation in MSME Creative Industry: A Confirmatory Factor Analysis

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ABSTRACT: Recent studies have highlighted the importance of digital transformation in enhancing the competitiveness of micro, small, and medium enterprises (MSMEs). However, the complex interaction of factors influencing digital adoption among MSMEs in the creative economy sector remains unexplored, especially in developing countries. This study investigates the determinants of digital transformation adoption in MSMEs, focusing on the relative influence of organizational, technological, and environmental factors. We adopt a quantitative approach by surveying 254 MSME owners and managers. The data were analyzed using confirmatory factor analysis (CFA) to assess the relationship between variables. Our findings show that organizational factors, followed by technology factors, have the most decisive influence on adopting digital transformation. While environmental factors are significant, they have a relatively minor impact. This study contributes to a more diverse understanding of digital transformation in MSMEs by emphasizing the excellence of the organization's internal capabilities. Our study shows that policies promoting digital adoption should prioritize strengthening organizational readiness and technology support.

Keywords: Digital Transformation, MSMEs, Organizational Factors, Technology Adoption, CFA

INTRODUCTION

In the context of the accelerated digital transformation of the global business landscape, digital transformation has emerged as a significant driver of change. The World Economic Forum (2023) reported that 70% of MSMEs worldwide have experienced increased revenue after adopting digital technology. Nevertheless, despite the considerable growth potential, the MSME creative industry continues to encounter considerable obstacles in adopting digital transformation (Buck et al., 2023; Skare et al., 2023). This phenomenon has attracted the attention of researchers and practitioners, given the vital role that creative MSMEs play in economic growth and innovation (Ahmed et al., 2022). A recent study by Alabdali and Salam (2022) revealed that only 35% of creative MSMEs have successfully implemented a

comprehensive digital strategy. It is of paramount importance to gain insight into the factors that drive digital transformation in this context, as this will facilitate the unlocking of the growth potential and competitiveness of creative MSMEs in the digital era (P. Chet al., 2022; Wang & Esperança, 2023).

In recent years, intensified research has focused on digital transformation in the creative MSME sector. In their study, Rahman et al. (2022) It identified several vital factors that influence the adoption of digital technology in MSMEs, including technological capability, management support, and competitive pressure—meanwhile, Nguyen et al. (2022) underscored the significance of fostering an innovation culture and organizational readiness to facilitate effective digital transformation in creative industries. Creativity, flexibility, and market orientation are distinctive factors driving digital transformation. However, as Hendrawan et al. (2024) They have demonstrated that creative MSMEs frequently encounter particular obstacles during the transformation process, including restricted resources and a lack of technical expertise. While these studies provide valuable insights, there is still a need for a more comprehensive understanding of the determinants of digital transformation in the specific context of creative MSMEs.

While the existing literature has significantly contributed to our understanding of digital transformation in MSMEs, some critical gaps still require further attention. Most research focuses on MSMEs in general, with minimal attention paid to the distinctive features of creative industries (Khlystova et al., 2022). Secondly, most studies employ qualitative or case-study methodologies, limiting the generalizability of the results (Hendrawan et al., 2024). Third, there is still considerable inconsistency in the definitions and measurement of digital transformation factors, which hinders comparability between studies (Anatan & Nur, 2023). Fourth, previous research has occasionally overlooked the intricate interconnections between the identified determinants (Bosua & Evans, 2024; Rupeika-Apoga & Petrovska, 2022). In light of previous research's shortcomings, this study underscores the pivotal role of digital transformation in MSMEs within the creative economy sector. Furthermore, it employs a quantitative methodology to elucidate the underlying factors influencing digital transformation in MSMEs.

In light of these research gaps, this study aims to identify the determinants of digital transformation in creative industry MSMEs through confirmatory factor analysis. In particular, this study seeks to answer the following research question: This study aims to identify the principal determinants of digital transformation in creative industry MSMEs and elucidate the structural relationships between these factors. We employed a quantitative methodology to address this question by surveying 500 creative MSMEs in Indonesia. The proposed conceptual model integrates factors identified from previous literature, including technological capability, innovation culture, market orientation, and management support (Phiet, 2024). This research aims to confirm the relevance of these factors in the context of creative MSMEs and uncover their complex structural relationships. Therefore, it is anticipated that a more profound and empirically substantiated comprehension of the intricacies of digital transformation within the creative MSME sector will be provided.

This research has substantial theoretical and practical significance. Theoretically, this study significantly contributes to developing a comprehensive digital transformation model specifically

tailored to the distinctive characteristics of creative industry MSMEs. The confirmatory factor analysis results will enhance our comprehension of the constructs and relationships among the determinants, establishing a robust foundation for further research in this domain. From a practical standpoint, the findings of this study can inform the design of more efficacious support programs for encouraging digital transformation in the creative MSME sector. For those engaged in creative MSMEs, the findings of this study can assist in identifying key areas and suitable strategies to accelerate their digital transformation. Moreover, a more profound comprehension of these determinants can facilitate advancing technology solutions more tailored to creative MSMEs' distinctive requirements.

This paper is organized into several main sections, each addressing a specific research question. Subsequently, the second section will present the research methodology, including the sample design, data collection instruments, and data analysis techniques. The fourth section will present the results of the confirmatory factor analysis and hypothesis testing. The fourth section will discuss the study's main findings, theoretical and practical implications, and limitations. Finally, the paper will summarise the study's main contributions and suggestions for future research in the digital transformation of creative industry MSMEs.

METHOD

This study employs a quantitative design with a cross-sectional approach to examine the factors influencing digital transformation in micro, small, and medium-sized creative industries. (Bougie & Sekaran, 2019). This design selection enables the collection of data from a substantial number of respondents within a relatively brief period, in alignment with the characteristics of dynamic MSMEs (Mohajan, 2020; Strijker et al., 2020). The independent variables encompass technological factors (technological compatibility, technological complexity, relative advantage), organizational factors (organizational support, human resources, innovation culture), and environmental factors (customer experience, government support, environmental uncertainty), with the adoption of digital transformation serving as the dependent variable.

The study's target population comprises MSMEs operating within the creative economy sector on the Indonesian island of Madura. As data from the East Java Provincial Cooperatives and MSMEs Office (2023) indicates, approximately 5,600 creative MSMEs are distributed across four districts in Madura. A random sampling method was employed to ensure the sample was representative. This technique was selected for its ability to provide an equal opportunity for each member of the population to be selected as a sample, thereby reducing the potential for selection bias. The sample size was determined through a G-power analysis, considering a medium-size effect ($f^2 = 0.3$), a significance level $\alpha = 0.05$, and a statistical power of 0.95. Accordingly, the minimum sample size required is 134 MSMEs (Faul et al., 2009; Kang, 2021)The number of samples was increased to 254 creative MSMEs in Madura to account for the potential for non-responsiveness and invalid data.

The data collection instrument utilized in this study employs a questionnaire developed based on a synthesis of existing literature about digital transformation. It has been adapted to align with the specific context of creative industry micro, small, and medium-sized enterprises (MSMEs) in Madura. The questionnaire is designed to measure nine key dimensions that represent the determinants of digital transformation, which are grouped into three broad categories: technological factors, organizational factors, and environmental factors. According to Omrani et al. (2024), technological factors are measured through three dimensions. It consists of technological compatibility (TC), technological complexity (TCOMP), and relative advantage (RA). Technological compatibility (TC) refers to the extent to which digital technologies are adopted following the existing information technology (IT) infrastructure within the company. TCOMP gauges the complexity of understanding and utilizing novel digital technologies. The relative advantage (RA) dimension assesses the extent to which the adoption of digital technology improves operational efficiency. The organizational factors are comprised of three dimensions: organizational support (OS), human resources (HR), and innovation culture (IC) (Phiet, 2024). The level of support provided by the top management for digital transformation initiatives is gauged by the organizational support (OS) dimension. The human resources department is responsible for evaluating the preparedness and proficiency of employees in adopting novel digital technologies. The IC dimension gauges the extent to which organizations propel innovative digital transformation concepts. Additionally, environmental factors encompass three dimensions: customer experience (CE), government support (GS), and environmental uncertainty (EU) (Ta & Lin, 2023). Customer experience (CE) measures how digital technology facilitates increased customer interaction. The GS dimension assesses the availability of financial incentives provided by the government for MSMEs to adopt digital technology. The EU assesses the degree to which accelerated technological evolution within the industry is propelling the implementation of digital transformation.

Each dimension was assessed using a single item on a 5-point Likert scale, with 1 indicating strong disagreement and 5 indicating strong agreement. This one-item measure was selected for its brevity and the reduced likelihood of respondents becoming fatigued with the lengthy questionnaire. It is particularly beneficial for MSME respondents who often have limited time (A. Nair et al., 2016). Nevertheless, utilizing this singular item reflects the assumption that the construct under examination is relatively concrete and unidimensional. Before the primary data collection commenced, a series of pilot tests were conducted on 30 MSMEs. The objective of these tests was to assess the clarity of the items, the time required to complete the questionnaires, and the initial reliability of the instruments. The pilot study's findings will inform any necessary minor adjustments to the instrument.

The data analysis in this study employs the Confirmatory Factor Analysis (CFA) method with the assistance of SmartPLS software. The choice of CFA is driven by the research objective, which is to validate the construct and test the relationship between factors that have been postulated based on existing theories (Dash & Paul, 2021). SmartPLS was selected as the analysis tool due to its capacity to accommodate intricate models comprising numerous constructs and indicators and its superior ability to estimate measurement and structural models simultaneously (Hair et al., 2020; Phakiti, 2018).

Compared to covariance-based methods, such as AMOS or LISREL, SmartPLS has the advantage of handling smaller sample sizes and data that is not normally distributed. This is a particularly pertinent consideration given the intrinsic characteristics of MSME data, which frequently fail to align with the assumption of multivariate normality. Moreover, SmartPLS allows for examining intricate mediation and moderation effects, crucial in this research to elucidate the interplay between the factors influencing digital transformation.

The analysis will be conducted in two phases. Initially, the measurement model will be evaluated to ascertain the reliability and validity of the construct. Subsequently, the structural model will be assessed to test the research hypothesis. The evaluation criteria include indicator reliability, composite reliability, convergent validity (average variance extracted), and discriminatory validity (heterotrait-monotrait ratio).

RESULT AND DISCUSSION

Respondent Demographics

A descriptive analysis of the respondents' demographics revealed that most 254 respondents were male (58%), while the remaining were female (42%). The age distribution of the respondents is notably diverse, with the 20–30 age group representing 35% of the total, the 30–40 age group comprising 29%, and the over-40 age group accounting for 24%. A mere 12% of respondents are below the age of 20. The respondents' educational attainment is dominated by university graduates (39%) and high school graduates (30%), indicating that most MSME actors have a relatively strong educational background. Regarding business duration, most respondents (51%) have been engaged in business operations for five years, indicating a relatively high level of experience in the MSME sector. Conversely, 30% of respondents have an operational business for one to three years, while 18% have been in business for four to five years. Regarding the number of assets, over half of the respondents (52%) have assets of less than Rp 50,000,000, which indicates that micro and small businesses dominate the research sample.

The most prevalent micro, small, and medium-sized enterprise (MSME) subsector in this study is keris (29%), followed by culinary (25%) and performing arts (23%). Additionally, the music subsector is also represented to a notable extent (19%). In contrast, other subsectors, including fine arts, photography, television, and radio, are underrepresented. The diversity of these subsectors reflects the richness and diversity of the creative industries in the research area, with a particular emphasize on products and services with strong cultural and traditional values.

Table 1. Respondent Demographics

Criterion	Category	Sum	Percentage
Gender	Man	148	58%
	Woman	106	42%
Age	Less than 20 years old	31	12%
	20-30 Years	88	35%
	30-40 Years	73	29%
	Over 40 Years	62	24%
Education Level	Non-Formal Education	0	0%
	Elementary school	33	13%
	Junior High School/MTs	46	18%
	High School/Equivalent	75	30%
	College	99	39%
Length of Business	1-3 Years	77	30%
	4-5 Years	46	18%
	More than 5 Years	130	51%
Number of MSME Assets	Less than IDR 50,000,000	133	52%
	IDR 50,000,000 – IDR 100,000,000	42	17%
	IDR 100,000,000 – IDR 150,000,000	31	12%
	IDR 150,000,000 – IDR 200,000,000	24	10%
	More than IDR 200,000,000	24	10%
MSMEs Subsector	Music	49	19%
	Art	7	3%
	Culinary	64	25%
	Photographers	2	1%
	Television and Radio	2	1%
	Keris	73	29%
	Performing Arts	57	23%

Instrument Validity and Reality Testing

Convergent validity analysis is a crucial technique for evaluating the extent to which indicators of a specific construct exhibit a high proportion of variance (Lim, 2024; Voorhees et al., 2016). This analysis enables us to ascertain the reliability and validity of our measurement model, which is crucial for identifying the factors that influence Micro, Small, and Medium-Sized Businesses (MSMEs) to adopt digital transformation. The confirmatory factor analysis (CFA) results conducted using the SmartPLS software package provided substantial evidence supporting the convergent validity of our proposed model.

The analysis results demonstrate robust factor loading across the entire model, with values ranging from 0.704 to 0.879, significantly exceeding the generally accepted threshold of 0.7 (Hair et al., 2020; Sarstedt et al., 2016). This indicates a robust correlation between the indicators and

their corresponding latent variables. The factor loading for environmental uncertainty is 0.879, which indicates that this variable is a highly robust indicator of environmental factors influencing digital transformation. Similarly, organizational support (0.863) and human resources (0.829) demonstrate a considerable influence, emphasizing their pivotal role in organizational digital adoption.

Table 2. Value of The Loading Factor of Each Construct

Construction	Items	Loading Factor
Environmental Factors	Customer_Experience	0.782
	Environmental_Uncertainty	0.879
	Government_Support	0.732
Organizational Factors	Human_Resources	0.829
	Innovation_Culture	0.716
	Organizational_Support	0.863
Technological Factors	Relative _Advantage	0.816
	Technological_Compatibility	0.773
	Technological_Complexity	0.704

In the technology domain, the relative excellence (0.816) and technology compatibility (0.773) indices exhibit robust convergent validity, underscoring the pivotal role of technological elements in driving digital transformation. The Customer Experience construct also exhibits a robust loading value of 0.782, underscoring its pivotal role in the digital transformation process for MSMEs.

While the Culture of Innovation (0.716) and Technological Complexity (0.704) exhibit somewhat diminished loadings compared to other constructs, they nevertheless exceed the 0.7 thresholds, confirming their validity within the model. These results demonstrate that the measurement items accurately represent the expected structure. This provides a robust basis for further investigation into the factors that drive digital transformation in the MSME creative industry.

Three key metrics are Cronbach's alpha, composite reliability (CR), and average variance extracted (AVE). These metrics assess the validity and reliability of constructs in structural equation modelling (Sarstedt & Hwang, 2020). It is beneficial to know that these tests demonstrate that the factors influencing micro, small, and medium-sized businesses' (MSMEs) decisions to adopt digital technologies are internally consistent, reliable, and convergent. The following analysis examines these metrics based on the confirmatory factor analysis (CFA) results obtained through the SmartPLS software.

Cronbach's alpha values for all three factors—environment (0.752), organization (0.798), and technology (0.807)—exceeded the recommended threshold of 0.7, indicating good internal consistency and reliability. This indicates that the items within each construct are highly correlated and collectively assess the same fundamental concepts. The organizational factor and

the technology factor both demonstrate the highest levels of internal consistency, while the environmental factor exhibits a slightly lower but still acceptable level of reliability.

The Composite Reliability Score (CR) reinforces the reliability of the construction. With scores of 0.774 for environmental factors, 0.825 for organizational factors, and 0.807 for technology factors, all exceeding the 0.7 benchmark, the results demonstrate strong internal consistency and measurement reliability. The organizational factor exhibits the highest CR, indicating exceptionally robust reliability.

Table 3. Construction Reliability Testing

	Cronbach's alpha	**Composite reliability**	**Average variance extracted (AVE)**
Environmental Factors	0.752	0.774	0.514
Organizational Factors	0.798	0.825	0.604
Technological Factors	0.807	0.807	0.586

The Average Variance Extracted (AVE) value offers empirical evidence of convergent validity. All three environmental, organizational, and technology factors demonstrated values exceeding the recommended threshold 0.5. This demonstrates that the latent variable accounts for more than half of the variance in its indicator, thereby providing evidence of adequate convergence validity. Notably, the organizational factor exhibits the highest AVE, which indicates that this construct captures a substantial amount of variance in its indicators relative to measurement errors.

These results collectively support the reliability and validity of the measurement model in testing the determinants of digital transformation adoption in MSMEs. The consistency of performance across all three metrics provides a robust foundation for further structural model analysis and interpretation.

Discrimination Validity Testing

The Heterotrait-Monotrait Ratio (HTMT) method represents a crucial approach for evaluating the construct discrimination validity of a research model (Henseler et al., 2015). In identifying the determinants of digital transformation adoption in micro, small, and medium enterprises (MSMEs), the results of the HTMT analysis offer valuable insights. The HTMT value between environmental and organizational factors is 0.632, while between environmental and technological factors, it is 0.583, based on the data obtained. These values are below the generally accepted threshold of 0.85, indicating that discrimination between the constructs is valid.

Nevertheless, the HTMT value between organizational and technology factors, which reached 0.745, suggests a more robust relationship, although it remains within the acceptable range. These findings indicate that the three factors have sufficient conceptual differences, but there is a closer relationship between organizational and technological aspects in the context of MSME digital transformation.

Table 4. Discrimination Validity Testing

	Environmental Factors	Organizational Factors	Technological Factors
Environmental Factors			
Organizational Factors	0.632		
Technological Factors	0.583	0.745	

Goodness of Fit (GoF)

The goodness of fit (GoF) test is pivotal in assessing a confirmatory factor analysis (CFA) model. It evaluates the extent to which the proposed model aligns with empirical data (Phakiti, 2018). In the context of research on the determinants of digital transformation adoption in micro, small, and medium enterprises (MSMEs), the GOF analysis provides a comprehensive overview of the quality of the models used (Hair et al., 2020).

Table 5. Goodness of fit (GoF) testing

Goodness of Fit	**Value**
Chi-square	59.093
Number of model parameters	21
Number of observations	254
Degrees of freedom	24
P value	0
ChiSqr/df	2.462
RMSEA	0.076
RMSEA LOW 90% CI	0.052
RMSEA HIGH 90% CI	0.101
GFI	0.95
AGFI	0.906
PGFI	0.507
SRMR	0.049
NFI	0.945
TLI	0.949
CFI	0.966
AIC	101.093
BIC	175.377

The analysis results demonstrated a Chi-square value of 59.093 with a degree of freedom of 24, resulting in a Chi-square/df ratio of 2.462. This value is below the threshold of 3, indicating an

excellent model fit. The Root Mean Square Error of Approximation (RMSEA) yielded a value of 0.076, with a 90% confidence interval between 0.052 and 0.101. This indicates a reasonably good match, although slightly above the ideal threshold of 0.06. Additional match indices provide substantial support for the model. The goodness of fit index (GFI) of 0.950 and the adjusted goodness of fit index (AGFI) of 0.906 indicates an excellent fit, exceeding the threshold of 0.90. The standardised root means square residual (SRMR) of 0.049 is below the threshold of 0.08, indicating a small residual. Comparative indices, including the Normed Fit Index (NFI), the Tucker-Lewis Index (TLI), and the Comparative Fit Index (CFI), all exceeded the threshold of 0.95, indicating an excellent model fit in comparison to the null model. The Akaike Information Criterion (AIC) value of 101.093 and the Bayesian Information Criterion (BIC) of 175.377 may be employed for future comparisons of alternative models. In sum, the results of this goodness-of-fit (GOF) test provide substantial support for the validity of the model employed in identifying the determinants of digital transformation adoption in MSMEs. However, there is limited scope for improvement based on the RMSEA values.

This research offers valuable insights into the factors influencing the adoption of digital transformation in micro, small, and medium-sized enterprises (MSMEs), focusing on three main dimensions: environmental, organizational, and technological factors. The findings indicate that organizational factors exert a more pronounced influence on adopting digital transformation than technological factors. Environmental factors, while significant, demonstrate a comparatively weaker impact. The analysis demonstrated that organizational factors exhibited the highest composite reliability value (0.825) and average variance extracted (AVE) of 0.604. This illustrates the significance of management support, innovation culture, and human resource capabilities for MSMEs during the digital transformation process.

The preponderance of organizational factors in adopting MSME digital transformation may reflect the distinctive attributes of MSMEs themselves (Álvarez Jaramillo et al., 2019). In contrast to larger companies, which tend to have more established structures and resources, MSMEs rely heavily on their internal capabilities and organizational culture (Ahmed et al., 2022; Crupi et al., 2020). The high reliability and validity values for organizational factors indicate that elements such as management support, an innovation culture, and human resources play a crucial role. This may be attributed to the nature of MSMEs, which are more flexible and responsive to change. In such entities, internal commitment and capabilities are the primary catalysts for adopting new technologies.

These findings contribute to our understanding of the adoption of digital transformation in the context of MSMEs and expand the existing literature on the subject. This study's results align with those of Khin and Ho's study (2018), which underscores the significance of organizational capabilities in adopting digital technology. However, this study makes a distinctive contribution by demonstrating the relevance of these findings in the context of MSMEs. The pronounced influence of technological factors in this study lends support to the position advanced by Ta and Lin, (2023) Regarding the pivotal role of technology alignment with business requirements. However, our findings contribute further nuances to this argument, indicating that technology factors do not stand alone in the context of MSMEs but are closely related to organizational factors. This is evidenced by the high HTMT value between the two factors (0.745).

The close relationship between organizational factors and technology demonstrates a synergistic relationship between these two aspects in the context of MSMEs. Organizational cultures that support innovation are more conducive to adopting new technologies (Ahsan, 2024). Conversely, the availability of technology that aligns with the needs of MSMEs can facilitate the organizational changes necessary for successful adoption (J. Nair et al., 2019). This confirms that digital transformation is not merely about implementing technology but also about holistically transforming the organization. Interestingly, although environmental factors demonstrate a relatively lower influence (AVE 0.514, Cronbach's alpha 0.752), their existence as a valid and reliable factor challenges the view of Nikopoulou et al (2023), who tend to underestimate the role of external factors in technology adoption by MSMEs. Our findings indicate that, while environmental influences may not be as dominant as internal factors, they remain relevant and cannot be ignored. Competitive pressures, government support, and environmental uncertainty continue to influence MSMEs' decisions to adopt digital transformation, albeit with a lower intensity than that exerted by internal factors.

In the context of digital transformation in MSME creative industries, the finding that environmental factors have less influence than organizational factors is intriguing and merits further investigation. This phenomenon can be explained from several theoretical and practical viewpoints. First, this finding reflects the distinctive characteristics of the creative MSME sector, where internal innovation and adaptability are frequently the primary drivers of change (Huang & Huang, 2020; Mady et al., 2023). The smaller scale of operations and more flexible structures characteristic of creative MSMEs may afford them a greater capacity to respond to digital opportunities through internal initiatives rather than relying on external impulses (Mai et al., 2024; Omrani et al., 2024). The capacity of an organization to manage resources, develop digital capabilities, and cultivate an innovative culture appears to exert a more significant influence on the digital transformation process (Satar et al., 2024). Furthermore, these findings may indicate deficiencies in the ecosystem that supports creative MSMEs. It is possible that environmental factors, such as government policies, digital infrastructure, or competitive pressures, have not been sufficiently integrated or effectively promoted regarding the adoption of digital technologies among MSMEs. This prompts a crucial inquiry into the efficacy of external interventions and the necessity of adapting policy strategies to facilitate more effective digital transformation within the sector.

These findings have significant implications for both practice and policy. For managers of MSMEs, this result underscores the significance of developing organizational capabilities and a culture that fosters innovation as a foundational element in the digital transformation process. Developing human resources, fostering an innovative culture, and aligning organizational strategy with emerging technologies are essential for success. These findings indicate that policy interventions to drive the digital transformation of MSMEs must prioritize providing technology, strengthening organizational capacity, and creating a conducive environment.

CONCLUSION

This study aims to identify and analyze the principal factors influencing the adoption of digital transformation in micro, small, and medium-sized enterprises (MSMEs). The analysis results indicated the presence of three key determinants: organizational, technological, and environmental. The organizational factors were identified as exerting the most significant influence. This finding corroborates the assertion that the digital transformation of MSMEs is not merely a technological phenomenon but rather a multifaceted process entailing intricate interactions between internal capabilities and external dynamics. This research contributes significantly to the existing literature on digital transformation in the context of MSMEs, which has previously been underrepresented. The study's findings indicate that the success of MSME digital transformation is contingent upon the organization's preparedness and capacity to align technology with business requirements.

The implications of these findings extend to both the theoretical and practical realms. Theoretically, this study contributes to the existing technology adoption model by underscoring the significance of organizational factors within the context of MSMEs. This challenges the assumption that technology adoption is primarily driven by external factors or the mere availability of technology. In practical terms, these findings underscore the necessity for a comprehensive strategy to facilitate the digital transformation of MSMEs. For managers of MSMEs, these findings underscore the importance of developing organizational capabilities and an innovation culture as a foundation for digital transformation. These findings highlight the necessity for policymakers to implement support programs that prioritize not only the provision of technology but also the enhancement of MSME organizational capabilities. This research contributes significantly to the field by comprehensively integrating the organizational, technological, and environmental factors within the specific context of MSMEs.

While this research provides valuable insights, it is essential to acknowledge the study's limitations. Firstly, focusing on MSMEs in a single geographic area may restrict the applicability of the findings to other contexts. Secondly, the cross-sectional nature of this study precludes the observation of changes in digital transformation adoption over time. Thirdly, this study does not consider the variation between industrial sectors within the context of MSMEs. To address these limitations, future research should investigate the adoption of MSME digital transformation in diverse geographical and industrial contexts. Furthermore, longitudinal studies are required to elucidate the temporal dynamics of adopting MSME digital transformation. Moreover, further research could investigate the specific interactions between organizational and technological factors in the digital transformation process of MSMEs.

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