The Effect of Digital Literacy and Technology Use on the Performance of Micro, Small and Medium Enterprises (MSMEs)

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Abstract. This study aims to examine the impact of digital literacy and technology implementation on the performance of micro, small and medium enterprises (MSMEs) in the digital transformation era. The method used in this research is a quantitative approach by conducting a survey of 35 randomly selected MSME players. Data were collected through a closed questionnaire and analyzed by multiple linear regression with the help of SPSS. The findings of this study indicate that digital literacy and technology implementation have a significant positive influence on MSME performance, increasing operational efficiency, expanding markets, and increasing revenue. These results emphasize the importance of digital competency as a strategy to improve MSME competitiveness. This study provides the latest empirical data on the relationship between digital literacy, technology and MSME performance in Indonesia, and highlights the importance of continuous digital literacy training and technological infrastructure support to strengthen MSME competitiveness in the digital era.

Keywords: Digital Literacy, Technology Adoption, Business Performance.

Introduction

Amid the rapid advancement of information technology, digitalization has become an urgent necessity across all economic sectors, including Micro, Small, and Medium Enterprises (MSMEs). MSMEs play a crucial role in the national economy as job creators, drivers of local economies, and pillars of inclusive and sustainable growth (Naidu & Chand, 2021). However, the fast-paced changes in the digital era demand that MSMEs adapt to remain relevant and competitive.

One of the primary challenges faced by MSMEs in the digitalization process is the low level of digital literacy among business actors. Digital literacy encompasses not only technical skills in operating technological devices but also critical thinking, effective information management, digital communication, and online collaboration (Husniyah et al., 2023). Entrepreneurs with low digital literacy often struggle to utilize technology optimally, potentially hindering their business performance.

The use of digital technologies such as social media, e-commerce platforms, financial management systems, and other operational software has been proven to improve business efficiency, expand market reach, and support MSME operations (Anrimbi, 2023). Nevertheless, the adoption of these technologies remains uneven, particularly in regions with limited infrastructure and access to digital training (Cyberlink, 2023). This creates a gap between MSMEs with access to technology and those without.

Digital transformation is not merely about adopting technology but also about how entrepreneurs understand and apply it to support their business strategies. With adequate digital literacy, MSMEs can more easily leverage technology to enhance competitiveness, accelerate business growth, and optimize operations. Conversely, a lack of digital literacy can hinder this transformation.

Therefore, the development of digital literacy integrated with the provision of technological infrastructure should be prioritized to support MSME advancement. Continuous digital literacy training, equitable access to technology, and collaboration with stakeholders are strategic steps to ensure MSMEs can survive and thrive in the digital era.

Previous studies have shown a positive and significant relationship between digital literacy, technology use, and MSME performance (OECD, 2019; Naidu & Chand, 2021). However, most of these studies are limited to specific regions and have not thoroughly examined the integration of both factors in influencing business performance simultaneously. This study aims to fill that gap by investigating the combined effect of digital literacy and technology use on MSME performance.

This research seeks to answer two main questions:

1. To what extent does digital literacy affect MSME performance?
2. Does technology adoption significantly contribute to enhancing MSME competitiveness and operational efficiency?

Literature Review

Digital literacy is the ability of individuals to access, understand, evaluate, and utilize information and communication technology effectively and efficiently in daily life, including in business activities (Naidu & Chand, 2021; Cyberlink, 2023). Digital literacy is not only limited to technical skills in using digital devices but also includes the ability to manage information, communicate, and collaborate using digital media (Husniyah et al., 2023). In the context of MSMEs, digital literacy is crucial to support adaptation to technological developments, expand market access, and enhance operational efficiency (Arimbi, 2023; UN Air, 2023).

The use of technology, particularly digital technology like the internet, social media, and e-commerce platforms, has become a strategic tool for MSMEs in running and developing their businesses (Hanifah & Sarwoprasodjo, 2021). Through digital technology, MSMEs can more broadly promote products, reach new customers, and increase productivity and business management effectiveness (Arimbi, 2023; Kominfo, 2023). However, the adoption level of this technology heavily depends on the digital literacy level of MSME players, where impediments such as limited knowledge, infrastructure, and human resource readiness still exist (Cyberlink, 2023).

The performance of MSMEs refers to the enterprise's ability to achieve its business goals, which can be measured through sales increase, income, operational efficiency, and overall business growth (Sari & Nugroho, 2023). The improvement of MSME performance is significantly influenced by the ability of business operators to adopt digital technology and enhance their digital literacy (OECD, 2019; Naidu & Chand, 2021). With sufficient digital literacy and optimal use of technology, MSMEs can increase competitiveness, expand market share, and manage businesses more effectively.

Previous studies have shown that digital literacy has a positive and significant impact on MSME performance. For instance, Husniyah et al. (2023) found that the digital literacy level of MSME players in West Java was high and contributed to business performance improvement, especially in communication, critical evaluation, and digital collaboration aspects. Another study by Naidu and Chand (2021) confirms that digital literacy helps MSMEs enhance operational efficiencies and expand market reach. Nonetheless, research also reveals obstacles in digital literacy and technology application, such as lack of training, infrastructure limitations, and resistance to technological changes (Cyberlink, 2023).

Previous research has provided essential insights into the relationship between digital literacy, technology usage, and MSME performance. Its advantages include providing strong empirical evidence of the importance of digital literacy as a key success factor for MSMEs in the digital era. However, most research remains limited to specific geographic areas like West Java and Bali and has not extensively examined the inhibitory factors and strategies to improve digital literacy comprehensively. Therefore, this study aims to develop the study by expanding the regional scope and adding an analysis of specific technology use concerning MSME performance.

Digital literacy has become a key factor in enhancing the performance of Micro, Small, and Medium Enterprises (MSMEs) in today's digital era. According to Poon and Swatman (1999), digital literacy encompasses the ability to use information and communication technology effectively in a business context. Employees and MSME owners with good digital literacy can utilize technology to improve operational efficiency, expand market reach, and enhance customer interaction.

However, challenges arise when low digital literacy hampers MSME performance. According to Dutta and Mia (2010), many MSMEs still struggle to adopt digital technology, which can lead to an inability to compete in an increasingly competitive market. Employees unskilled in using digital tools may spend more time completing tasks that could be done more efficiently, thereby reducing MSME productivity and overall performance.

On the other hand, high digital literacy can enhance MSMEs' ability to innovate and adapt to market changes. According to Dyer and Gregersen (2004), MSMEs with employees possessing good digital literacy skills are more likely to identify new opportunities and develop products or services that meet customer needs. This can increase competitiveness and performance in the market.

However, there are risks associated with using digital technology in MSMEs. According to Lim et al. (2001), unproductive internet use, such as cyberloafing, can distract employees from their tasks and reduce performance. In the MSME context, time spent on non-work activities online can negatively impact productivity and the overall performance of the company (Corgnet et al., 2015).

Previous research indicates that digital literacy can contribute to MSME performance improvement, but it can also pose challenges if not managed well. According to Jiang et al. (2021), it is important for MSMEs to develop policies that support the effective use of digital technology while regulating internet use in the workplace to minimize cyberloafing behavior.

Overall, digital literacy has a significant impact on MSME performance. Employees and MSME owners with good digital literacy skills tend to be more productive and capable of adapting to market changes. However, if these skills are misused for non-work purposes, such as cyberloafing, it can lead to performance decline. Therefore, it is crucial for MSMEs to wisely manage digital literacy and technology use to achieve optimal performance. Based on this, the following hypothesis is proposed:

H1: Digital Literacy has a positive impact on the performance of MSME players

Technology implementation in Micro, Small, and Medium Enterprises (MSMEs) has become a crucial factor in supporting their performance improvement amid intensifying market competition. According to Bharadwaj et al. (2013), the adoption of information and communication technology helps MSMEs in improving business processes, increasing operational efficiency, and expanding market reach. By adopting technologies such as digital management systems, e-commerce, and social media, MSMEs can enhance customer access and manage resources more effectively.

Additionally, Rangarajan et al. (2015) state that technology integration in MSMEs also facilitates faster and data-driven decision-making, positively impacting performance and competitiveness. MSMEs

effectively utilizing technology can monitor inventory, track sales, and conduct market analysis more accurately to optimize their business strategies.

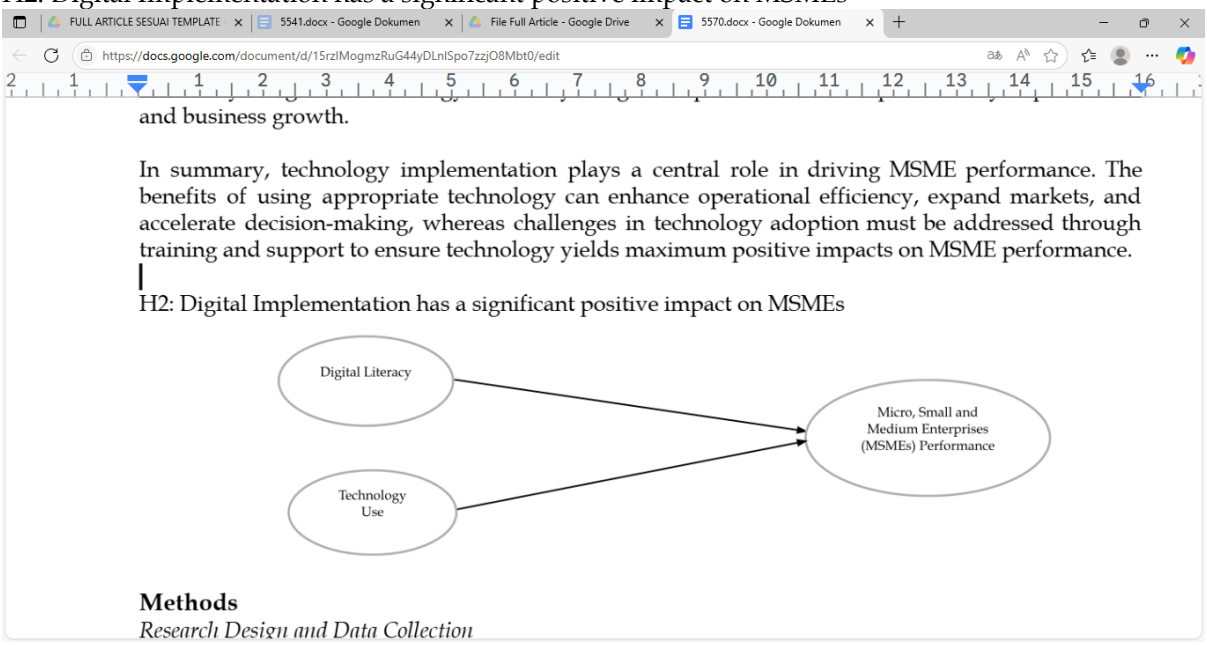
However, technology implementation challenges remain a major obstacle for many MSMEs. According to Oliveira and Martins (2010), resource constraints, lack of technological knowledge, and resistance to change are significant hindrances. MSMEs unable to properly adopt technology risk experiencing performance stagnation and productivity decline due to inappropriate or suboptimal use of tools.

On the other hand, research by Li et al. (2018) highlights the importance of providing training and increasing technological capacity for MSME players to ensure technology implementation is well-received and executed. Enhancing digital competencies not only assists MSMEs in technology usage but also in product and service innovations that can attract more customers.

Furthermore, a study by Gebremariam and Weismantel (2020) suggests that selecting appropriate technology that aligns with business characteristics greatly influences MSME performance. Relevant and easily integrated technology tends to yield greater positive effects on productivity improvement and business growth.

In summary, technology implementation plays a central role in driving MSME performance. The benefits of using appropriate technology can enhance operational efficiency, expand markets, and accelerate decision-making, whereas challenges in technology adoption must be addressed through training and support to ensure technology yields maximum positive impacts on MSME performance.

H2: Digital Implementation has a significant positive impact on MSMEs



Methods

Research Design and Data Collection

This study employed a quantitative research methodology, which is commonly used to examine a specific population or sample (Sugiyono, 2017). The questionnaire was developed using Google Forms and distributed via social media platforms such as WhatsApp and Instagram. The target population consisted of Micro, Small, and Medium Enterprises (MSMEs) in East Java that had integrated digital technology into their business operations. The study aimed to produce representative and reliable findings regarding the impact of digital literacy and technology adoption on MSME performance in the era of digital transformation.

The data collection process began by identifying a sampling frame of MSMEs across various regions in East Java that had adopted digital technologies in their operations. Respondents were selected randomly to ensure that each MSME in the population had an equal chance of being included. Data were collected through a closed-ended questionnaire distributed directly to the respondents.

Respondents were screened through a preliminary question to ensure they met the inclusion criteria. Only those who confirmed the use of digital technologies—such as social media, business applications, or online platforms—in their business activities were allowed to proceed with the questionnaire. This ensured that the data collected were relevant to the study's focus on digital literacy and its impact on business performance.

The sampling technique used was probability-based random sampling. According to Sekaran and Bougie (2016), random sampling provides each member of the population with an equal opportunity to be selected, thereby minimizing selection bias and enhancing the representativeness of the findings. This method also allows for greater generalizability of the results compared to non-probability sampling techniques.

Respondent Profile

The respondent profile revealed that 25 participants (63.2%) were male and 14 (36.3%) were female, aligning with Tambunan (2019), who noted that male entrepreneurs tend to dominate digital technology adoption. The age distribution was concentrated in the 16–20 and 21–25 age groups, each comprising 14 respondents (36.8%), reflecting the tendency of younger generations to adopt digital technologies (Wardani & Susilo, 2020).

In terms of education, the majority held a senior high school diploma or equivalent (52.6%), followed by bachelor's degree holders (36.8%), D4 diploma holders (7.9%), and D3 diploma holders (2.6%). This distribution suggests that digital technology adoption is not limited to those with higher education (Purwana et al., 2017). Regarding marital status, 28 respondents (73.7%) were unmarried, while 10 (26.3%) were married, which may influence flexibility in adopting new technologies (Putri & Kuncoro, 2017).

Most respondents had less than five years of business experience (71.7%), followed by 6–10 years (23.7%) and 11–15 years (5.3%). This dominance of newer entrepreneurs reflects a trend among digital MSMEs that integrate technology from the outset (Sari & Wirdanto, 2021).

Variable Measurement

The study employed a five-point Likert scale ranging from "Strongly Disagree" (1) to "Strongly Agree" (5), a format widely used in similar research (Hair et al., 2019). The digital literacy variable was measured using indicators adapted from the Digital Literacy Framework developed by Gilster (1997) and updated by Martin (2006), which include the ability to access, manage, integrate, evaluate, and communicate digital information.

The technology adoption variable was measured based on the framework from *The Role of Technology Adoption* (Ni Putu et al., 2023), which assesses the extent to which MSME actors adopt and adapt to new technologies. Indicators include the ability to select relevant technologies, comfort in using them, integration into business processes, perceived benefits, ease of use, and behavioral intention to continue using technology as part of digital business adaptation.

Data Analysis

Data analysis was conducted using multiple linear regression with IBM SPSS Statistics 23. This technique was chosen to examine the influence of the independent variables (digital literacy and

technology adoption) on the dependent variable (MSME performance). SPSS 23 was selected for its robust capabilities in analyzing causal relationships and its user-friendly interface (Field, 2018).

This analytical approach aligns with previous studies that have used similar methods to investigate factors influencing MSME performance (Ghozali, 2018; Hair et al., 2019). Prior to regression analysis, classical assumption tests were conducted—including tests for normality, multicollinearity, heteroscedasticity, and autocorrelation—to ensure that the regression model met the criteria of the Best Linear Unbiased Estimator (BLUE).

Result and Discussion

Measurement Model Assessment

This section presents the key findings of the study regarding the influence of digital literacy and technology implementation on the performance of Micro, Small, and Medium Enterprises (MSMEs). The analysis was conducted using a quantitative approach, involving multiple stages of rigorous statistical testing to ensure that the results obtained are valid, reliable, and generalizable. The discussion is based on data collected through questionnaires and processed using SPSS software.

Table 1. Validity and Reliability Test

Construct	Corrected item-Total Correlation	Cronbach's Alpha
X1 (Literasi Digital)	0,320	0,880
X1.1	0,376	
X1.2	0,628	
X1.3	0,686	
X1.4	0,489	
X1.5	0,468	
X1.6	0,410	
X2 (Use of technology)		
X2.1	0,478	
X2.2	0,728	
X2.3	0,527	
X2.4	0,451	
Y (Business performance)		
Y.1	0,617	
Y.2	0,795	
Y.3	0,492	
Y.4	0,696	
Y.5	0,488	

All items across the three variables—Digital Literacy, Technology Use, and Business Performance—have corrected item-total correlation values above 0.3 and Cronbach's Alpha values above 0.6. These results indicate that the research instrument is both valid and reliable, and thus suitable for consistently measuring the intended constructs.

Table 2. Normality Test

Construct	.Sig
X1	0,123
X2	0,011
Y	0,030

The significance value for X1 is greater than 0.05, indicating that the Digital Literacy variable is normally distributed. However, X2 and Y have significance values below 0.05, suggesting that these variables are not perfectly normally distributed. Nevertheless, the analysis can proceed, as multiple linear regression is generally robust to minor violations of normality in moderately sized samples.

Table 3. Multicollinearity Test

Construct	Tolarance
X1	0,598
X2	0,598

Tolerance values for both independent variables exceed 0.1, and the corresponding VIF values are below 10 (not shown), indicating no multicollinearity. Therefore, the independent variables are not linearly correlated and can be included in the regression model.

Table 4. Heteroscedasticity Test

Construct	.Sig
X1	0,895
X2	0,354

Both significance values are above 0.05, indicating that the residuals are randomly distributed. This confirms that the regression model satisfies the homoscedasticity assumption and is appropriate for prediction.

Table 5. Linearity Test

Construct	.Sig
X1	0,102
X2	0,002

The significance value for X2 is below 0.05, indicating a significant linear relationship between Technology Use and Business Performance. In contrast, X1 has a value above 0.05, suggesting a weaker linear relationship between Digital Literacy and Business Performance. This implies that Technology Use has a more direct linear influence on performance, while the effect of Digital Literacy may be more complex or mediated.

Table 6. Autocorrelation Test

Construct	DW	dL	dU	4-dU	4-dL
X1					
X2	1.628	1.373	1.574	2.426	2.627
Y					

The Durbin-Watson value of 1.628 falls between dU and 4 – dU (1.574 < 1.628 < 2.426), indicating no autocorrelation in the residuals. Thus, the regression model meets the classical assumption of independence of errors, and the parameter estimates are considered valid and reliable for inference.

Table 7. Multiple Linear Regression Test

Construct	T	F
X1	0,887	0
X2	0	

The R-squared value is 0.449, meaning that 44.9% of the variance in Business Performance (Y) is explained by the combination of Digital Literacy (X1) and Technology Use (X2). The F-value of 0.000 indicates that the regression model is statistically significant overall. Therefore, both independent variables jointly have a significant effect on MSME performance.

The results of this study reinforce the findings of Naidu & Chand (2021) and the OECD (2019), that digital competence and technology utilization have a positive impact on the productivity and competitiveness of MSMEs. The stronger influence of technology adoption (compared to digital literacy alone) indicates that technical skills in operating digital devices and applications have a direct impact on business operations and marketing.

Although digital literacy is influential, the results of the linearity test show a relationship that is not entirely linear. This may be influenced by other variables such as digital experience, the age of business owners, and access to training. This study addresses the research gap in previous studies, which typically examined only one variable, by presenting a combined approach that integrates both digital literacy and technology use.

For future research, it is recommended to expand the sample area and add supporting variables such as internet access, business capital, or government involvement. A mixed-method approach is also suggested to explore user experiences more deeply.

Conclusion

The findings of this research indicate that both digital literacy and technology adoption play a significant role in improving the performance of Micro, Small, and Medium Enterprises (MSMEs). Technology adoption showed a stronger and more linear influence, contributing directly to business operations, efficiency, and market expansion. In contrast, the effect of digital literacy appears to be more complex and potentially moderated by external factors such as access to training, digital experience, and age of the business owners. By integrating both variables, this study provides a broader understanding of how digital competence and technological readiness contribute to MSME competitiveness in the digital era. These insights suggest that strengthening digital infrastructure and providing continuous digital literacy support are crucial to empowering MSMEs for sustainable growth.

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