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Enhancing MSMEs' Financial Inclusion and Resilience through Financial and Digital Literacy

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Abstract

MSMEs often struggle to access formal financial services and maintain their resilience in the face of economic shocks. A financial literacy and financial inclusion framework can help develop financial resilience. Understanding the impact of financial and digital literacy on financial inclusion and resilience is still limited. This study aims to analyze the influence of financial and digital literacy on improving financial inclusion and resilience. The findings of this study are essential for policy interventions and long-term MSME resilience strategies. This explanatory research examines causal relationships among variables through hypothesis testing. The study objects are financial literacy and digital literacy, and their impact on financial inclusion and resilience in MSMEs in Bali. The instruments used were questionnaires on financial literacy, digital literacy, financial inclusion, and financial resilience. The sampling technique used was area purposive sampling. The sample consisted of 385 MSMEs. This study confirms that financial and digital literacy are crucial in improving MSME financial inclusion and resilience. Financial and digital literacy influence financial resilience. Financial inclusion is a significant mediating variable in building MSME resilience.

Keywords: Digital literacy, Financial inclusion, Financial literacy, Financial resilience, MSMEs

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1. Introduction

MSMEs need financial resilience in facing the VUCA (Volatility, Uncertainty, Complexity, Ambiguity) environment. Financial resilience (FR) is the ability to withstand, adapt to, and recover from adverse financial shocks using financial resources (Tengblad 2018; Salignac 2019; Saad *et al.* 2021). When MSMEs face an economic crisis, supply chain disruptions, or unexpected market fluctuations, financial resilience is a key determinant of business sustainability (Lestari *et al.* 2024; Sanusi *et al.* 2023). Therefore, building adaptive and responsive capacity to financial challenges is a priority in strengthening MSME resilience in digital disruption and an unstable global economy.

One strategic approach to building financial resilience is increasing financial and digital literacy. Financial literacy (FL) is a combination of financial knowledge, attitudes, and behaviour that must be possessed to make effective financial decisions (McManus *et al.* 2008; OECD 2022). Digital literacy (DL) is the owner's ability to use digital technology to strengthen decision-making, including data and information literacy, communication and collaboration, and security (Law *et al.* 2018; Laanpere 2019; Kateryna *et al.* 2020). These two forms of literacy enable MSME actors to understand financial risks and opportunities and to leverage digital technologies to support data-driven decision-making (OECD 2021; Lusardi *et al.* 2020). Financial literacy provides a foundation for managing finances wisely. In contrast, digital literacy enhances access to financial information, financial technology platforms, and digital services that support operational efficiency and business sustainability (Ratnawati *et al.* 2024; Khan *et al.* 2025). Previous studies have shown different findings regarding the influence of financial and digital literacy on financial resilience.

Previous studies have shown that financial and digital literacy increase financial inclusion (FI) and impact financial resilience (Morgan & Long 2020; Antonia Grohmann & Menkhoff 2021). Previous studies have also confirmed the significant positive influence of financial and digital literacy on financial resilience (Ariana *et al.* 2024). However, other studies have shown an indirect or insignificant influence (Meiyola Krisma Agatha *et al.* 2024). Pandin's research shows that financial inclusion has a significant negative effect on financial resilience (Pandin *et al.* 2021). This inconsistency opens space to explore the mechanisms underlying the relationship between literacy, inclusion, and resilience, especially in the context of MSMEs facing structural challenges in financial and digital infrastructure.

This study offers novelty by developing a conceptual model based on the Resource-Based View (RBV) framework (Barney 1991; 1995), which positions financial and digital literacy as strategic resources that drive inclusion and resilience. In addition, this approach fills a gap in the literature by examining the mediating role of financial inclusion in the relationship between literacy and financial resilience. This research is also urgent, considering the weak financial resilience of MSMEs post-pandemic and the low level of digital literacy in various informal sectors that dominate the economies of developing countries (World Bank 2021).

This study aims to analyze the effects of financial and digital literacy on the financial inclusion and financial resilience of MSMEs, and to test whether financial inclusion mediates the relationship. The findings of this study are expected to provide empirical contributions to the development of a literacy-based financial resilience model, as well as strategic policy recommendations to strengthen MSMEs in the era of digital transformation.

2. Research Methodology

This research is explanatory. Its objectives are financial and digital literacy, and their influence on financial inclusion and resilience. The instruments used are financial literacy questionnaires, digital literacy measures, financial inclusion measures, and financial resilience measures. The instruments use a 5-point Likert scale, from 1 (very bad) to 5 (very good). The sampling technique used is area purposive sampling. The sample consisted of 385 MSMEs. The analysis techniques used are descriptive and inferential, with SEM (Structural Equation Modeling).

3. Result

This study's respondents were 385 business actors spread across various business classifications, business sectors, and districts/cities in Bali Province. Most of the respondents were micro-enterprises (47.79%) engaged in the trade sector (73.77%), most operating in Badung Regency (31.17%).

The research analysis includes descriptive and inferential analyses. Descriptive analysis shows that the level of financial literacy of MSME actors is good. However, improving literacy in financial recording and business risk management is necessary. The level of digital literacy of MSME actors is good, but improving their ability to solve technical problems is necessary. The availability and ownership of financial services among business actors are relatively good, but efforts are needed to improve their use. MSMEs already have good basic abilities in maintaining financial balance and meeting financial obligations, but still need to strengthen emergency fund reserves and increase income capacity to build financial resilience.

Path model specifications: The path model consists of two elements: the inner and outer models. The research path model is shown in Figure 1.

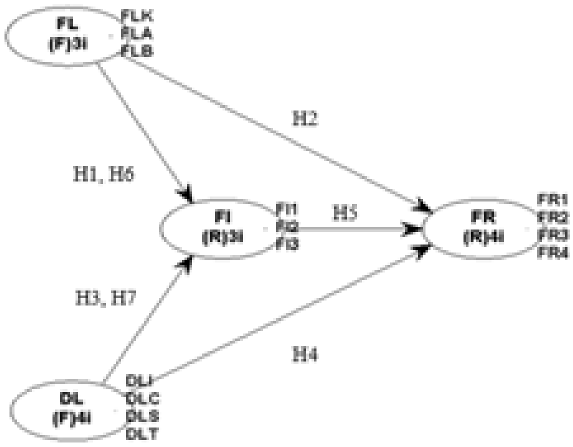

Figure 1. Path model

Measurement Model Evaluation: The evaluation of the measurement model includes tests of convergent validity, discriminant validity, and reliability. Indicator loadings≥ 0.70 and AVE values ≥ 0.50 indicate that the convergent validity criteria have been met. Discriminant validity has been met because the loading factor of each indicator that measures its latent variable is greater than the cross-loading value, and the Fornell-Lacker criterion has been met because the AVE root of each construct on the diagonal element is higher than the correlation between constructs on non-diagonal elements in the same column. The heterotrait-monotrait ratio (HTMT) is less than 0.90. Internal consistency reliability is appropriate, as indicated by the composite reliability and Cronbach's alpha values, which range from 0.60 to 0.70.

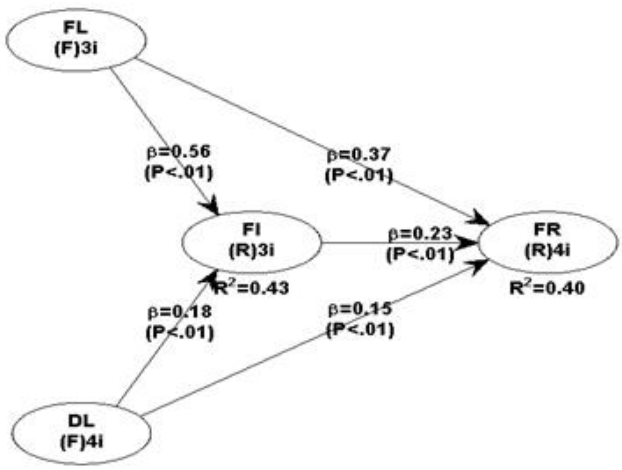

Figure 2. Path coefficients and P value

Structural Model Evaluation: The significance test of the relationship shows that financial literacy has a positive and significant effect on financial inclusion (β = 0.56; P < 0.001). Financial literacy also has a positive and significant effect on financial resilience (β = 0.37; P < 0.001). Financial literacy positively affects financial resilience through financial inclusion. Digital literacy has a positive and significant effect on financial inclusion (β = 0.18; P < 0.001). Digital literacy also has a positive and significant effect on financial resilience (β = 0.15; P < 0.001). Digital literacy positively affects financial resilience through financial inclusion. Financial inclusion has a positive and significant effect on financial resilience (β = 0.23; P < 0.001). Financial inclusion mediates the effect of financial literacy on financial resilience. Financial inclusion also mediates the effect of digital literacy on financial resilience.

The model's explanatory power can be tested using the R^2 and F^2 values. The R^2 value for financial inclusion is 0.43, meaning that financial literacy and digital literacy together explain 43% of the variance in financial inclusion. Meanwhile, the R^2 for financial resilience is 0.40, indicating that financial literacy, digital literacy, and financial inclusion simultaneously explain 40% of the variance in financial resilience. The F^2 effect size is the absolute value of the individual contribution of each latent predictor variable to the R^2 value of the criterion variable. The F^2 effect size indicates the change in the R^2 value of the criterion variable when the latent predictor variable is removed from the model. The f^2 effect size for FL-FI is classified as having a significant influence at the structural level (0.36 > 0.35). In contrast, DL-FI is classified as small (0.078<0.15), FL-FR is classified as moderate (0.212<0.35), DL-FR is classified as small (0.062<0.15), and FI-FR is classified as small at the structural level (0.123<0.15).

The model's predictive power is assessed using the Q-squared (Q2) statistic. Q-squared is an indicator of out-of-sample predictive power or predictive relevance. Q-squared values of 0.439 and 0.403 are greater than zero, indicating that the model has good predictive relevance. The model estimation results have good predictive validity.

Goodness-of-Fit Model Assessment: Evaluation of model fit using leading fit indicators shows that the goodness-of-fit criteria have been met. Average path coefficient (APC)=0.298, P<0.001; Average R-squared (ARS)=0.416, P<0.001. Average ad-justed R-squared (AARS)=0.412, P<0.001, Average block VIF (AVIF)=1.465, acceptable if <= 5, ideally <= 3.3, Average full collinearity VIF (AFVIF)=1.697, acceptable if <= 5, ideally <= 3.3, Tenenhaus GoF (GoF)=0.492, small >= 0.1, medium >= 0.25, large >= 0.36, Simpson's paradox ratio (SPR)=1.000, acceptable if >= 0.7, ideally = 1, R-squared contribution ratio (RSCR)=1.000, acceptable if >= 0.9, ideally = 1, Statistical suppression ratio (SSR)=1.000, acceptable if >= 0.7, Nonlinear bivariate causality ratio direction (NLBCDR)=1,000, acceptable if >= 0.7.

3. Discussion

Financial literacy positively impacts financial inclusion. This finding supports the assumption that the higher the level of financial literacy of MSMEs, the greater their ability to access and utilise formal financial services. Financial literacy strengthens business actors' understanding of financial products and risks, thus increasing their confidence in using services such as business loans, savings, or insurance (Lusardi & Mitchell, 2017). This aligns with findings by A. Grohmann *et al.* (2018), which show that financial literacy is a key determinant of inclusive behaviour towards the financial system.

Digital literacy has a positive impact on financial inclusion. These results confirm that digital literacy plays an enabler in expanding MSME access to technology-based financial services. This finding is consistent with studies by Adel (2024) and Desy Wulan Ayuning Gumilar *et al.* (2024), highlighting the important role of digital literacy in driving digital financial inclusion. Digital literacy also has a positive impact on financial resilience. These findings support the study by Pawenang *et al.* (2024), which shows that digital capabilities enhance organisational resilience.

Financial inclusion positively impacts financial resilience. Access to financial services such as working capital loans, savings products, and insurance enables businesses to manage risk and navigate economic uncertainty more effectively (Demirgüç-Kunt & Singer 2017). Financial literacy positively impacts financial resilience through financial inclusion. These findings suggest that the effect of financial literacy on resilience is not entirely direct but rather mediated by increased financial inclusion. This strengthens the argument in a study (Antonia Grohmann & Menkhoff 2020) that inclusion is a crucial channel in linking cognitive abilities to financial outcomes. Digital literacy positively impacts financial resilience through financial inclusion. As demonstrated by Lyons *et al.* (2020) and Kass-Hanna *et al.* (2021), inclusion is a crucial intermediary between digital skills and business resilience, especially in the post-pandemic era.

This study has limitations. Its cross-sectional nature meant it could not observe changes in literacy and resilience over time. The study location was limited to Bali, thus limiting the generalizability of the results. The quantitative approach did not provide in-depth insights into cultural or psychological barriers to adopting digital financial services.

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