



## **The Impact of Fintech Implementation and Digital Financial Literacy on Financial Inclusion in Bangkalan Regency**

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### **ABSTRACT**

This study examines the effects of fintech implementation and digital financial literacy on financial inclusion in Bangkalan Regency, Indonesia. A quantitative approach with a causal associative design was employed using survey data collected from 42 respondents selected through purposive sampling. The data were analyzed using multiple linear regression after the research instruments satisfied validity, reliability, and classical assumption tests. The findings indicate that both fintech implementation and digital financial literacy have positive and significant effects on financial inclusion. However, digital financial literacy demonstrates a substantially stronger influence than fintech implementation, indicating that individuals' capability to understand and utilize digital financial services is more critical than the mere availability of financial technology. Furthermore, the regression model explains 81.5% of the variation in financial inclusion, suggesting that these two factors jointly play an important role in improving financial inclusion in Bangkalan Regency. The findings imply that policies aimed at expanding financial inclusion should prioritize strengthening digital financial literacy alongside the development of fintech services to improve public trust, financial capability, and the effective use of digital financial services.

**Keywords:** Fintech, Digital Financial Literacy, Financial Inclusion



## INTRODUCTION

The rapid development of financial technology (fintech) has transformed the financial services sector by enabling faster, more efficient, and more accessible digital transactions. In Indonesia, fintech has become an important instrument for expanding access to financial services and promoting financial inclusion, particularly among communities with limited access to conventional banking. Nevertheless, the expansion of digital financial services has not been accompanied by an equivalent increase in their effective utilization. In many regions, including Bangkalan Regency, financial inclusion remains relatively low despite the growing availability of fintech services. This condition is associated with limited digital financial literacy, inadequate understanding of financial products, and concerns regarding the security of digital transactions. These challenges suggest that technological availability alone is insufficient to improve financial inclusion without the capability of individuals to use digital financial services safely, confidently, and effectively.

Previous studies have consistently shown that fintech contributes to financial inclusion by improving access to financial services, increasing transaction efficiency, and extending financial services to previously underserved populations (Danladi et al., 2023). However, its effectiveness remains influenced by several factors, including financial literacy, consumer protection, and data security (Bath, 2025; Huy, 2025). In addition, fintech has been reported to support MSME development and broader financial inclusion, although its implementation is often constrained by digital infrastructure and technological literacy (V et al., 2024). Financial behavior, financial literacy, and users' perceptions of usefulness and ease of use have also been identified as important determinants of financial inclusion (Liu et al., 2021; Appiah & Venyo, 2025). These findings indicate that technological innovation alone cannot ensure inclusive financial participation without adequate financial capability among users.

The challenges observed in Bangkalan Regency illustrate this issue. Although digital financial services are increasingly available, many residents, particularly those in rural areas, continue to experience difficulties in accessing and utilizing fintech services effectively. Limited digital financial literacy, relatively low educational attainment, inadequate digital infrastructure, and concerns regarding transaction security reduce public confidence in adopting digital financial services. Consequently, the availability of fintech has not yet translated into optimal financial



inclusion, highlighting a gap between access to technology and its practical utilization within the community.

Despite the growing body of literature, several important research gaps remain. First, previous studies have generally examined the influence of fintech implementation and digital financial literacy separately, while empirical evidence comparing their relative contribution to financial inclusion within a single analytical framework remains limited. Second, existing studies predominantly focus on urban settings or national-level analyses, providing limited evidence from rural regions where digital infrastructure, educational attainment, and financial capability are relatively lower. Third, few studies have investigated which factor—fintech implementation or digital financial literacy—plays a more dominant role in improving financial inclusion under such local conditions.

Accordingly, the novelty of this study lies in directly comparing the relative influence of fintech implementation and digital financial literacy on financial inclusion in the rural context of Bangkalan Regency. This study aims to determine the partial and simultaneous effects of both variables while identifying the factor that contributes more substantially to improving financial inclusion in the local community.

## RESEARCH METHOD

This study uses a quantitative approach with an individual unit of analysis, namely the community in Bangkalan Regency as respondents.(Alvarez & Wright, 2023)The focus of the research is to measure the impact of the implementation of financial technology (fintech) and digital financial literacy on financial inclusion.(Adel, 2024)The independent variables in this study consist of fintech implementation and digital financial literacy, while the dependent variable is financial inclusion. The variables were measured using relevant indicators, such as access to and quality of financial services for financial inclusion, as well as understanding, ability, and confidence in using technology for digital financial literacy.(Hasan et al., 2021).

The research design used was quantitative with an associative causal approach, which aimed to examine the relationships and influences between variables. This study employed a survey method with a structured questionnaire instrument based on a Likert scale (1-5). This design was chosen because it can provide an empirical picture of the relationship between fintech



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implementation and digital financial literacy on financial inclusion statistically.

The data sources in this study consist of primary and secondary data. Primary data were obtained directly from respondents through questionnaires distributed to the Bangkalan Regency community using a purposive sampling technique, specifically those who have used or are familiar with fintech services. Meanwhile, secondary data were obtained from various trusted sources, such as the Financial Services Authority (OJK), Bank Indonesia, as well as scientific journals and other publications relevant to the research topic.

The data collection process was carried out by distributing questionnaires online. Prior to use, the research instruments were tested for validity and reliability to ensure data accuracy and consistency. Data analysis was performed using multiple linear regression analysis techniques with the aid of statistical software such as IBM SPSS Statistics. (Vanus et al., 2019). In addition, classical assumption tests were also conducted, including normality, multicollinearity, and heteroscedasticity tests, to ensure the regression model met the analysis requirements, so that the research results could provide accurate conclusions regarding the influence between variables.

## RESULTS AND DISCUSSION

### Validity Test

**Table 1.** Validity Test Results

a. Fintech Implementation (X1) ( $N = 42$ ;  $r\text{-table} = 0.3044$ )

| Variable                    | Item | r-count | r-table | Decision |
|-----------------------------|------|---------|---------|----------|
| Fintech Implementation (X1) | X1.1 | 0.859   | 0.3044  | Valid    |
|                             | X1.2 | 0.775   | 0.3044  | Valid    |
|                             | X1.3 | 0.885   | 0.3044  | Valid    |
|                             | X1.4 | 0.924   | 0.3044  | Valid    |
|                             | X1.5 | 0.909   | 0.3044  | Valid    |

b. Digital Financial Literacy (X2) ( $N = 42$ ;  $r\text{-table} = 0.3044$ )

| Variable                        | Item | r-count | r-table | Decision |
|---------------------------------|------|---------|---------|----------|
| Digital Financial Literacy (X2) | X2.1 | 0.912   | 0.3044  | Valid    |
|                                 | X2.2 | 0.922   | 0.3044  | Valid    |
|                                 | X2.3 | 0.922   | 0.3044  | Valid    |
|                                 | X2.4 | 0.787   | 0.3044  | Valid    |
|                                 | X2.5 | 0.904   | 0.3044  | Valid    |



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c. Financial Inclusion (Y) ( $N = 42$ ;  $r\text{-table} = 0.3044$ )

| Variable                | Item | r-count | r-table | Decision |
|-------------------------|------|---------|---------|----------|
| Financial Inclusion (Y) | Y1   | 0.861   | 0.3044  | Valid    |
|                         | Y2   | 0.917   | 0.3044  | Valid    |
|                         | Y3   | 0.965   | 0.3044  | Valid    |
|                         | Y4   | 0.850   | 0.3044  | Valid    |
|                         | Y5   | 0.946   | 0.3044  | Valid    |

The validity test demonstrates that all questionnaire items possess correlation coefficients exceeding the critical value ( $r = 0.3044$ ). The correlation values range from 0.775–0.924 for fintech implementation, 0.787–0.922 for digital financial literacy, and 0.850–0.965 for financial inclusion. These results indicate that every measurement item is valid and appropriate for subsequent statistical analysis.

### Reliability Test

**Table 2.** Reliability Test Results

| Variable                        | Cronbach's Alpha | Standard | Decision |
|---------------------------------|------------------|----------|----------|
| Fintech Implementation (X1)     | 0.927            | >0.60    | Reliable |
| Digital Financial Literacy (X2) | 0.934            | >0.60    | Reliable |
| Financial Inclusion (Y)         | 0.947            | >0.60    | Reliable |

All research variables achieved Cronbach's Alpha values substantially higher than the recommended threshold of 0.60, indicating excellent internal consistency. These findings confirm that the research instrument reliably measures the constructs of fintech implementation, digital financial literacy, and financial inclusion.

### Classical Assumption Tests

#### Normality Test

**Table 3.** One-Sample Kolmogorov–Smirnov Test

| Variable               | Value        |
|------------------------|--------------|
| N                      | 42           |
| Mean                   | 0.0000000    |
| Standard Deviation     | 2.06551478   |
| Absolute Difference    | 0.128        |
| Positive Difference    | 0.110        |
| Negative Difference    | -0.128       |
| Test Statistic         | 0.128        |
| Asymp. Sig. (2-tailed) | <b>0.083</b> |



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*Note: Lilliefors Significance Correction.*

The Kolmogorov–Smirnov test produced a significance value of **0.083**, which exceeds the significance level of **0.05**. Therefore, the residuals are normally distributed, indicating that the normality assumption required for multiple linear regression has been satisfied.

### Multicollinearity Test

**Table 4.** Multicollinearity Test Results

| Variable                        | Tolerance | VIF   | Decision             |
|---------------------------------|-----------|-------|----------------------|
| Fintech Implementation (X1)     | 0.202     | 4.958 | No Multicollinearity |
| Digital Financial Literacy (X2) | 0.202     | 4.958 | No Multicollinearity |

The multicollinearity test indicates tolerance values greater than 0.10 and VIF values below 10 for both independent variables. These findings demonstrate that no substantial correlation exists between the predictor variables, confirming that multicollinearity is not present in the regression model.

### Heteroscedasticity Test

**Table 5.** Glejser Heteroscedasticity Test

| Variable                        | B      | Std. Error | t      | Sig.         | Decision              |
|---------------------------------|--------|------------|--------|--------------|-----------------------|
| Constant                        | 1.990  | 0.899      | 2.214  | 0.033        | —                     |
| Fintech Implementation (X1)     | 0.170  | 0.100      | 1.693  | <b>0.099</b> | No Heteroscedasticity |
| Digital Financial Literacy (X2) | -0.209 | 0.100      | -2.080 | <b>0.060</b> | No Heteroscedasticity |

The Glejser test reveals significance values of 0.099 for fintech implementation and 0.060 for digital financial literacy, both exceeding the threshold of 0.05. Accordingly, the regression model does not exhibit heteroscedasticity, indicating that the variance of the residuals remains constant across observations. Collectively, the normality, multicollinearity, and heteroscedasticity tests confirm that the regression model satisfies the classical assumptions required for hypothesis testing.

### Multiple Linear Regression Analysis

**Table 6.** Multiple Linear Regression Results

| Variable                    | B     | Std. Error | Beta  | t     | Sig.  |
|-----------------------------|-------|------------|-------|-------|-------|
| Constant                    | 1.448 | 1.333      | —     | 1.087 | 0.284 |
| Fintech Implementation (X1) | 0.184 | 0.152      | 0.178 | 2.159 | 0.043 |



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|                                 |       |       |       |       |        |
|---------------------------------|-------|-------|-------|-------|--------|
| Digital Financial Literacy (X2) | 0.742 | 0.149 | 0.745 | 4.982 | <0.001 |
|---------------------------------|-------|-------|-------|-------|--------|

The estimated multiple linear regression model is expressed as:

$$Y = 1.448 + 0.184X_1 + 0.742X_2$$

The regression results indicate that both independent variables positively influence financial inclusion. Fintech implementation contributes positively to financial inclusion ( $B = 0.184$ ;  $p = 0.043$ ), suggesting that greater utilization of fintech services is associated with higher levels of financial inclusion. However, digital financial literacy demonstrates a substantially larger regression coefficient ( $B = 0.742$ ;  $p < 0.001$ ), indicating that improvements in digital financial literacy provide a stronger contribution to financial inclusion than fintech implementation.

## Partial Significance Test (t-test)

**Table 7.** Partial t-test Results

| Variable                        | t     | Sig.   | Decision    |
|---------------------------------|-------|--------|-------------|
| Fintech Implementation (X1)     | 2.159 | 0.043  | Significant |
| Digital Financial Literacy (X2) | 4.982 | <0.001 | Significant |

The partial hypothesis testing confirms that both independent variables significantly affect financial inclusion. Fintech implementation has a positive and significant influence ( $t = 2.159$ ;  $p = 0.043$ ). Likewise, digital financial literacy significantly affects financial inclusion ( $t = 4.982$ ;  $p < 0.001$ ) and exhibits the highest standardized coefficient ( $\beta = 0.745$ ), indicating that it is the dominant predictor in the proposed regression model.

## Simultaneous Significance Test (F-test)

**Table 8.** ANOVA Results

| Source     | Sum of Squares | df | Mean Square | F      | Sig.   |
|------------|----------------|----|-------------|--------|--------|
| Regression | 818.984        | 2  | 409.492     | 91.300 | <0.001 |
| Residual   | 174.920        | 39 | 4.485       |        |        |
| Total      | 993.905        | 41 |             |        |        |

The ANOVA results demonstrate that the regression model is statistically significant ( $F = 91.300$ ;  $p < 0.001$ ). This finding indicates that fintech implementation and digital financial literacy jointly explain variations in financial inclusion. Therefore, the proposed regression model is appropriate for examining the influence of the independent variables on financial inclusion.



## Coefficient of Determination

**Table 9.** Coefficient of Determination

| R     | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin–Watson |
|-------|----------|-------------------|----------------------------|---------------|
| 0.908 | 0.824    | 0.815             | 2.11781                    | 1.602         |

The coefficient of determination indicates that the regression model explains 81.5% of the variation in financial inclusion, as reflected by the Adjusted  $R^2$  value of 0.815. The remaining 18.5% is attributable to other variables not included in the present study. The high explanatory power suggests that fintech implementation and digital financial literacy collectively represent important determinants of financial inclusion among the respondents.

Nevertheless, these findings should be interpreted with caution because the analysis is based on a relatively small sample ( $n = 42$ ). Although the sample size is adequate for an exploratory regression model involving two predictor variables, a larger and more diverse sample would improve the robustness and generalizability of the findings. Future studies are therefore encouraged to validate the proposed model using broader populations and additional explanatory variables.

## Discussion

The findings demonstrate that both fintech implementation and digital financial literacy significantly contribute to financial inclusion in Bangkalan Regency. However, the magnitude of their influence differs considerably. While fintech implementation has a positive and significant effect, digital financial literacy emerges as the dominant predictor of financial inclusion, as indicated by its substantially larger standardized regression coefficient ( $\beta = 0.745$ ) compared with fintech implementation ( $\beta = 0.178$ ). These findings suggest that improving financial inclusion depends not only on expanding digital financial services but also on strengthening individuals' ability to understand, evaluate, and confidently utilize those services.

The positive effect of fintech implementation indicates that technology-based financial services reduce barriers to accessing formal financial institutions by providing more efficient payment systems, fund transfers, savings, and financing services. Digital financial platforms enable users to conduct transactions regardless of geographical constraints, thereby increasing opportunities for financial participation. This finding supports previous studies demonstrating



that fintech contributes to broader financial access and greater efficiency in financial service delivery, particularly in developing countries (Danladi et al., 2023; Kanga et al., 2022; Singh & Sahni, 2020). Nevertheless, the relatively modest regression coefficient suggests that technological availability alone is insufficient to substantially improve financial inclusion.

A possible explanation lies in the behavioral factors that influence fintech adoption. The decision to use digital financial services is not determined solely by access to technology but also by users' perceptions of transaction security, service reliability, ease of use, and expected benefits. Individuals who perceive fintech platforms as complex or vulnerable to fraud are less likely to adopt them, even when the services are readily available. Concerns regarding cybercrime, misuse of personal information, and financial loss may discourage users from utilizing digital financial services. Consequently, perceived risk and limited trust remain important barriers that weaken the contribution of fintech to financial inclusion, particularly in communities with relatively limited experience in digital financial transactions.

The most important finding of this study is the dominant influence of digital financial literacy on financial inclusion. This result indicates that financial capability plays a more decisive role than technological accessibility in determining whether individuals participate in formal financial systems. Digital financial literacy enables individuals to understand financial products, compare available services, evaluate transaction risks, protect personal information, and make informed financial decisions. As a result, individuals with higher levels of digital financial literacy are more likely to adopt fintech services effectively and continuously, thereby increasing their level of financial inclusion. This finding is consistent with Hasan et al. (2021), who emphasized that financial literacy is a key determinant of successful fintech utilization, and with Alsemgeest (2015), who argued that financial literacy provides the foundation for rational financial decision-making.

The stronger influence of digital financial literacy can also be explained by the characteristics of Bangkalan Regency, where disparities in educational attainment, digital competence, and exposure to financial technology remain evident. Although fintech services have become increasingly available, many community members still experience difficulties in understanding application features, completing digital transactions, or recognizing fraudulent schemes. These conditions contribute to digital anxiety, a situation in which individuals feel



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uncertain or uncomfortable when interacting with unfamiliar digital technologies. Digital anxiety often reduces confidence in adopting fintech services, particularly among individuals with limited financial capability. Consequently, access to technology alone cannot guarantee greater financial inclusion unless accompanied by adequate financial knowledge and digital competence.

Another important consideration is that financial inclusion represents a behavioral outcome rather than merely a technological outcome. Individuals may have access to digital financial services but choose not to use them because they lack confidence in managing digital transactions or perceive the associated risks to outweigh the expected benefits. Therefore, digital financial literacy serves as the mechanism through which technological innovation is translated into actual financial participation. This explains why the effect of digital financial literacy is substantially stronger than that of fintech implementation in the present study.

From a policy perspective, these findings imply that efforts to improve financial inclusion should extend beyond expanding digital financial infrastructure. Government agencies, financial institutions, fintech providers, and educational organizations should collaborate to strengthen digital financial literacy through continuous educational programs, practical training, cybersecurity awareness campaigns, and financial education initiatives tailored to local community characteristics. Such interventions are expected to reduce trust barriers, lower perceived risks, minimize digital anxiety, and improve individuals' confidence in using digital financial services. Integrating technological innovation with financial education is therefore likely to produce more sustainable improvements in financial inclusion than focusing solely on technological expansion.

Despite the strong explanatory power of the proposed regression model (Adjusted  $R^2 = 0.815$ ), the findings should be interpreted in light of several limitations. The study involved only 42 respondents, which limits the statistical generalizability of the results to the wider population of Bangkalan Regency or other regions. Although the sample size remains adequate for exploratory multiple regression involving two independent variables, future studies should employ larger and more heterogeneous samples to improve external validity. Furthermore, additional variables such as income level, educational background, digital infrastructure, financial behavior, and trust in financial institutions should be incorporated to provide a more comprehensive understanding of the factors influencing financial inclusion in rural communities.



## CONCLUSION

This study concludes that both fintech implementation and digital financial literacy positively and significantly influence financial inclusion in Bangkalan Regency. However, digital financial literacy demonstrates a substantially stronger contribution than fintech implementation, indicating that improving individuals' capability to understand and utilize digital financial services is more influential than merely expanding access to financial technology. These findings suggest that technology alone is insufficient to increase financial inclusion unless it is supported by adequate financial knowledge, digital competence, and confidence in using digital financial services.

The regression model explains 81.5% of the variation in financial inclusion, indicating that fintech implementation and digital financial literacy jointly represent the principal determinants of financial inclusion among the respondents. Nevertheless, the remaining variation suggests that other factors, such as income, educational attainment, digital infrastructure, and financial behavior, may also contribute to financial inclusion and should be considered in future research.

The findings have important practical implications for policymakers, financial institutions, fintech providers, and educational organizations. Efforts to improve financial inclusion should not focus solely on expanding fintech infrastructure but should also prioritize sustainable digital financial literacy programs that strengthen financial capability, enhance trust in digital financial services, reduce perceived risks and digital anxiety, and improve the public's ability to make informed financial decisions. Such integrated strategies are expected to generate more sustainable and inclusive financial development, particularly in rural communities with characteristics similar to Bangkalan Regency.

This study is limited by its relatively small sample size (42 respondents) and focus on a single regional context. Therefore, future studies are recommended to involve larger and more diverse samples while incorporating additional variables, including income level, educational background, digital infrastructure, financial behavior, and trust in financial institutions, to obtain a more comprehensive understanding of the determinants of financial inclusion.



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