


Islamic Financial Literacy and Technological Innovation Among Millennial Women Micro-Entrepreneurs in Bandar Lampung

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Article History:	Abstract
<p>Corresponding: Ruslaini rosimuhammadiyahlampung@gmail.com</p> <p>Submitted: March 16th, 2026</p> <p>Revised: April 13th, 2026</p> <p>Accepted: May 6th, 2026</p> <p>Published: June 2nd, 2026</p> <p>Copyright: ©2026. Ruslaini, Indupurnahayu, Qurroh Ayuniyyah, Immas Nurhayati.</p>  <p>This article is licensed under the Creative Commons Attribution-Share Alike 4.0 International License. http://creativecommons.org/licenses/by-sa/4.0/</p>	<p>Objective: This study aims to examine the direct effect of Islamic financial literacy on women’s economic roles and its indirect effect, mediated by technological innovation, among millennial women micro-entrepreneurs in Bandar Lampung.</p> <p>Method: This study employs a quantitative approach using survey data collected from women micro-entrepreneurs. A total of 130 questionnaires were initially collected across Lampung Province, with 65 valid samples selected through purposive sampling based on specific criteria. The data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM).</p> <p>Result: The findings reveal that Islamic financial literacy has a positive and significant effect on technological innovation ($\beta = 0.691, p < 0.001$), while technological innovation has a strong positive effect on women’s economic roles ($\beta = 0.703, p < 0.001$). Islamic financial literacy also directly influences women’s economic roles ($\beta = 0.211, p = 0.021$), although the effect size is smaller. Additionally, technological innovation significantly mediates this relationship (indirect effect = 0.486, $p < 0.001$), with the model demonstrating strong explanatory power ($R^2 = 0.745$).</p> <p>Implication: These findings suggest that policymakers and MSME development institutions should integrate Islamic financial literacy programs with digital capacity-building initiatives.</p> <p>Originality or Novelty: This study highlights the mediating role of technological innovation in linking Islamic financial literacy to women’s economic roles, providing empirical evidence from millennial women micro-entrepreneurs in a developing regional context.</p> <p>Keywords: Islamic financial literacy; Micro-enterprises; Millennial women; Technological innovation; Women entrepreneurs.</p>

Introduction

Micro, small, and medium-sized enterprises (MSMEs) play a strategic role in the global economy. This sector accounts for approximately 90% of all businesses worldwide and employs the majority of the workforce, making it a primary driver of economic growth and job creation. (Bayraktar & Algan, 2019). Furthermore, MSMEs play a crucial role in fostering inclusive economic development, particularly by empowering communities that previously had limited

access to economic resources, including women. (Dindin Abdurohim, 2023; Sutrisno et al., 2024).

Women's participation in economic activities not only contributes to economic growth but also improves household well-being and family economic resilience. (Ruslaini et al., 2026) Microenterprises managed by women often serve as the primary source of income for families, making the strengthening of women's entrepreneurial capacity a crucial aspect of sustainable economic development. (Gigauri, 2025). In the face of increasingly competitive economic dynamics, MSME entrepreneurs must be able to manage their businesses effectively and adaptively. One important factor influencing this ability is financial literacy. Financial literacy enables entrepreneurs to understand financial management concepts, plan for the future, and make more rational economic decisions. (Benardi Benardi et al., 2023). Entrepreneurs with a high level of financial literacy tend to be better able to manage financial resources and develop their businesses sustainably. (Puspita et al., 2024).

On the other hand, the development of digital technology has brought significant changes to business activities. Digital transformation enables micro-entrepreneurs to improve operational efficiency, expand market reach, and create innovations in products and services. (Ruslaini et al., 2026) The use of digital technologies such as social media, e-commerce platforms, and digital payment systems has become an integral part of micro-business development strategies in the digital economy. (Analia et al., 2023).

Recent evidence indicates that Islamic financial literacy in Indonesia remains relatively low compared with conventional financial literacy. According to the Financial Services Authority, Islamic financial literacy in Indonesia remains low, at around 39.1%, far below the national financial literacy rate of 65.43%. This situation indicates a significant gap in the public's understanding of the Sharia-based financial system. This low literacy reflects that the majority of the public has not yet fully grasped Sharia financial products and services, which is attributed to uneven access to Sharia financial services, limited product competitiveness and innovation, and a lack of understanding of Sharia financial principles. This gap is particularly relevant for micro-entrepreneurs, including women, who rely heavily on financial knowledge to sustain and grow their businesses. (Otoritas Jasa Keuangan, 2025). Additionally, Data from the Central Statistics Agency (BPS) shows that micro, small, and medium-sized enterprises (MSMEs) dominate Indonesia's economic structure. Furthermore, approximately 64.5% of MSME owners are women, equivalent to more than 37 million business owners, which underscores the significant role women play in managing and driving the MSME sector as one of the main pillars of the national economy. (BPS, 2021). However, in some regions, including Bandar Lampung, women-owned microenterprises still face challenges related to limited financial capacity and limited adoption of technology. This situation underscores the urgency of strengthening Islamic financial literacy in tandem with technological innovation, particularly among millennial women entrepreneurs.

From an Islamic economic perspective, financial literacy is not only related to understanding general financial concepts but also encompasses an understanding of Sharia principles in economic activities (Isnani et al., 2025; Safitri, 2024). Islamic financial literacy can promote more ethical, transparent, and sustainability-oriented business practices. An understanding of Islamic

financial principles can also help business actors manage economic activities more responsibly in accordance with Islamic economic values (Harti, 2024).

With advances in technology and changes in the characteristics of business owners, millennials are known to have a relatively higher level of adaptability to technology than previous generations. In the context of entrepreneurship, millennial women have great potential to integrate financial literacy with digital technology to develop more innovative and competitive microenterprises. (Tripathi & Agarwal, 2025). Technological innovation capabilities are a key factor enabling entrepreneurs to improve business efficiency and expand market opportunities. (Bhandari, 2025).

Although various studies have examined the relationship between financial literacy and microenterprise performance, most research still focuses on financial literacy in general. It has not specifically addressed Islamic financial literacy in the context of women's entrepreneurship. Furthermore, empirical studies examining the relationship between Islamic financial literacy and technological innovation capabilities among female micro-entrepreneurs remain limited. In particular, research on millennial women as a distinct, technology-oriented entrepreneurial group remains scarce, highlighting a significant gap in the existing literature. This gap underscores the importance of investigating how Islamic financial literacy interacts with technological innovation to enhance women's economic roles.

Based on the identified research gap, this study examines the relationships among Islamic financial literacy, technological innovation, and women's economic roles. Specifically, this study proposes that Islamic financial literacy influences technological innovation and women's economic roles, both directly and indirectly, with technological innovation serving as a mediating variable. Accordingly, four hypotheses (H1–H4) are developed and tested in this study.

Literature Review

Women's Economic Empowerment in Micro and Small Enterprises

Women's economic empowerment is a critical issue in development studies, particularly regarding women's roles in micro and small enterprises. Women entrepreneurs make significant contributions to improving household welfare, reducing poverty, and driving local economic growth. (Prithu Sarkar & Ravindra Gharpure, 2024; Vidya Kishan Alva & Dr. Kusum Thantry Dsa, 2024). In many developing countries, women-managed microenterprises are a primary source of household income diversification. (Durante et al., 2024).

Various studies indicate that women's participation in productive economic activities not only increases household income but also strengthens women's bargaining power in family decision-making. (Getahun & Villanger, 2018). When women have access to economic resources, they tend to allocate income toward education, health, and family well-being. Thus, women's entrepreneurship plays a strategic role in driving inclusive economic development and strengthening family resilience. (Purba et al., 2024).

However, women entrepreneurs still face various structural barriers, such as limited access to capital, market information, technology, and formal financial services. These barriers can hinder business development and limit women's ability to participate optimally in economic development. Therefore, strengthening women's economic capacity requires a supportive

institutional environment, including enhanced financial inclusion, technology adoption, and gender-responsive development policies.

Technology Adoption in Micro and Small Enterprises

The development of digital technology has become a key factor in enhancing the productivity and competitiveness of micro and small enterprises. The use of digital technology enables business owners to expand market access, reduce transaction costs, and improve operational efficiency. Within the Technology Acceptance Model (TAM), technology adoption is influenced by perceived ease of use and perceived benefits. (Arbaina Mayasari et al., 2024; Asmara et al., 2023). For MSMEs, the use of technologies such as digital payment systems, business management applications, and online platforms can streamline operational processes and expand market access.

Several empirical studies indicate that the use of digital technologies, such as social media for marketing, e-commerce platforms, and digital payment systems, can significantly improve the performance of microenterprises. (Yacob et al., 2023). Digital technology enables business owners to reach a wider market, increase consumer engagement, and improve business operations. (Debora Silvia Hutagalung, 2025; Siregar, 2024). For women entrepreneurs, the adoption of technology plays a more strategic role. Digital technology can help reduce various traditional barriers that women often face in accessing markets and business networks. (De Vita, 2023; Mweha, 2025). Digital platforms allow women to run their businesses more flexibly, even from home, enabling them to balance productive and domestic roles within the family. (Abdullah et al., 2025).

Nevertheless, the level of technology adoption among women entrepreneurs remains relatively varied. Limitations in digital literacy, access to technological infrastructure, and a lack of training and mentoring can hinder the optimal use of technology. Therefore, enhancing digital capacity is crucial to ensuring that women entrepreneurs can effectively use technology to improve business sustainability.

Islamic Financial Literacy in Micro-Entrepreneurship

Islamic financial literacy refers to the ability of individuals to understand and apply financial knowledge in accordance with Sharia principles when making economic decisions. (Solekah & Hakim, 2024). Islamic financial literacy integrates financial understanding with Islamic values, including the prohibition of *riba* (interest), the avoidance of *gharar* (uncertainty), and the promotion of ethical and socially responsible economic behavior. In the context of entrepreneurship, Islamic financial literacy enables business actors to manage financial resources more effectively while ensuring that business practices remain aligned with the principles of Islamic economics. (Suginam et al., 2025). Entrepreneurs with higher levels of financial literacy tend to be better able to allocate resources efficiently, evaluate financial risks, and identify opportunities for business development. (Oghenekome Urefe et al., 2024). From the perspective of Islamic finance, this capability also includes an understanding of Sharia-compliant financial instruments, such as profit-sharing schemes, Islamic financing mechanisms, and ethical investment practices that support sustainable business development.

In the context of women's entrepreneurship, Islamic financial literacy becomes increasingly important. Women entrepreneurs often face various constraints in accessing financial services, market information, and technological resources (Fatah Yasin et al., 2020). Strengthening Islamic

financial literacy can enhance women's economic capacity by enabling them to manage business finances more effectively, make more informed economic decisions, and utilize technological innovations to support business development. Therefore, Islamic financial literacy is expected to contribute not only to strengthening women's economic participation but also to encouraging the adoption of technological innovation among micro-entrepreneurs.

Ethics Foundation of Islamic Financial Literacy in Microenterprise Activities

Ethical values play a significant role in shaping business practices, particularly in societies where religion serves as the foundation for economic behavior. From the perspective of Islamic economics, business activities are not merely aimed at generating profit but must also be grounded in moral principles and social responsibility. (Kirillov & Pitaikin, 2023; Nurul A'yun, 2024). Islamic business ethics emphasizes values such as honesty (*ṣidq*), trustworthiness (*amānah*), justice (*ʿadl*), and responsibility (*mas'ūliyyah*) in all economic activities. These principles encourage business actors to conduct transactions transparently, avoid fraudulent practices, and maintain fair relationships with consumers, suppliers, and business partners. (Alif et al., 2025; Said Safri Ibrahim & Achmad Syamsul Huda, 2025).

In this study, these ethical principles are conceptually embedded within Islamic financial literacy, which not only reflects financial knowledge but also encompasses the internalization of Sharia values in economic decision-making. Thus, ethical awareness serves as an integral foundation for responsible financial behavior among micro-entrepreneurs. In the context of women-managed microenterprises, these values can influence how business owners make decisions, manage finances, and build customer relationships, thereby supporting sustainable and responsible business practices.

Technology as a Supporting Instrument for Ethical Economic Practices

From an Islamic economic perspective, technology can be understood as a *wasīlah* (instrument) that helps realize ethical values in modern economic practices. (Hamdani et al., 2025; Mardiyah et al., 2025). Technology is essentially neutral, but its use can be directed to support the implementation of ethical principles in business activities. (Jo & Raj, 2024; Wernaart, 2022). The use of digital technology can enhance transparency in financial transactions, strengthen accountability in business management, and facilitate fairer market access. (Rerung et al., 2024). Digital platforms also enable businesses to provide product information more openly to consumers, thereby supporting honest and transparent business practices. (Tolegenov et al., 2024; Veltri et al., 2023).

In line with this perspective, technological innovation in this study is positioned as a mediating mechanism that enables the application of Islamic financial literacy in practical business activities. Thus, technology supports the operationalization of ethical values embedded within Islamic financial literacy in the context of microenterprise development.

Although various studies have examined women's economic empowerment, technology adoption, and Islamic business ethics separately, research integrating these three aspects within a single analytical framework remains relatively limited. Most previous studies have focused on technology use in microenterprises or on aspects of Islamic business ethics, without examining the interconnection between the two in the context of women's economic empowerment. Furthermore, empirical research analyzing the interaction between technology adoption and

ethical values in women's business activities remains relatively scarce, particularly in the context of micro and small enterprises in developing countries.

Therefore, this study aims to address this gap by analyzing how the utilization of technology and the application of Islamic business ethics contribute to strengthening women's economic empowerment in micro and small enterprises. By integrating technological and ethical perspectives, this study is expected to provide a more comprehensive understanding of the factors supporting the development of inclusive and sustainable women's entrepreneurship.

Based on the conceptual framework described earlier, Islamic financial literacy is expected to play a significant role in enhancing entrepreneurs' ability to adopt and utilize technology, as well as in strengthening women's economic roles in microenterprise activities. Financial literacy enables entrepreneurs to understand the economic value of technological innovation better, manage financial resources effectively, and make informed business decisions.

Furthermore, technological innovation capabilities are considered key to improving business efficiency, expanding market access, and enhancing women's participation in economic activities. In this context, technological innovation is expected not only to have a direct effect on women's economic roles but also to mediate the relationship between Islamic financial literacy and those roles.

H1: Islamic financial literacy has a positive effect on technological innovation capabilities.

H2: Islamic financial literacy has a positive effect on women's economic roles.

H3: Technological innovation capabilities have a positive effect on women's economic roles.

H4: Technological innovation capabilities mediate the relationship between Islamic financial literacy and women's economic roles.

Research Methodology

This study employs a quantitative approach with a cross-sectional research design. This approach was chosen to analyze the empirical relationship between Islamic financial literacy and technological innovation capabilities in enhancing women's economic roles in microenterprises managed by millennial women. A cross-sectional design was used because data were collected at a specific point in time to obtain a snapshot of the respondents' conditions. (Wulandari, 2023). Data analysis in this study utilized the Partial Least Squares Structural Equation Modeling (PLS-SEM) 4.0 method. This method was chosen because it can simultaneously test causal relationships among latent variables in both the outer and inner models. (Haji-Othman et al., 2024). Furthermore, PLS-SEM is considered suitable for studies with relatively small sample sizes and for research models involving several latent constructs. (Haji-Othman et al., 2024; Mohamad Yusof et al., 2025).

This study was conducted in Bandar Lampung City. The selection of this city was based on the consideration that it serves as the center of educational and economic activities in Lampung Province and has a relatively high number of micro-businesses, particularly those managed by women. (Astuti et al., 2023; Maulana et al., 2024). Data collection took place over three months, from May to July 2025. The population of this study comprises micro-businesses managed by millennial women in Bandar Lampung City. This is based on data from the Bandar Lampung City Cooperative and MSME Statistics Office. However, this data has not been classified in detail based on the gender of the business owners, the age of the business, or the business's active status.

These data limitations prevent this study from using probability sampling techniques based on a numerically defined population. Therefore, this study employs purposive sampling, a sampling technique based on specific criteria relevant to the study's objectives. The criteria for respondents in this study include millennial women who run micro-enterprises, have a higher education background, have been in business for at least two years, and operate in the culinary sector. In determining the sample size, this study refers to the recommendations in (Wynne W Chin, 2000) which suggests a minimum of 30 to 100 respondents for PLS-SEM analysis, as well as the ten-times rule, which recommends a minimum sample size of ten times the number of indicators in the most complex indicator set in the research model. Based on these considerations, this study uses 65 respondents who meet the research criteria.

This study used two types of data: primary and secondary. Primary data were collected through a structured questionnaire distributed to female millennial micro-entrepreneurs in Bandar Lampung City. The research instrument was designed based on variables identified in the empirical literature and adapted to the conditions of female micro-entrepreneurs at the study site. Each statement item in the questionnaire was measured using a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Meanwhile, secondary data were obtained from various official sources, including publications by the Central Statistics Agency (BPS) and the Lampung Province Cooperative and MSME Office, as well as reports and publications relevant to the development of microenterprises and women's entrepreneurship.

This study involves three main variables: Islamic financial literacy as the independent variable, technological innovation capability as the mediating variable, and the role of women in the economy as the dependent variable. These variables were operationalized into several indicators, developed from a literature review and adapted to the empirical conditions of female micro-entrepreneurs at the study site. Data analysis in this study employed the Partial Least Squares Structural Equation Modeling (PLS-SEM) method using SmartPLS version 4.0. The analysis was conducted in two main stages, namely outer model evaluation and inner model evaluation.

The outer model evaluation was conducted to assess the validity and reliability of the constructs through several indicators, namely outer loading values, Cronbach's Alpha, Composite Reliability, and Average Variance Extracted (Yarsasi et al., 2025) A construct is considered reliable if the Cronbach's Alpha and Composite Reliability values are greater than 0.7, and it meets the criteria for convergent validity if the AVE value is greater than 0.5. Meanwhile, an internal model evaluation was conducted to test the relationships among latent variables within the research model. This testing was performed by examining the coefficient of determination (R^2), path coefficients, and the significance of relationships among constructs obtained through the bootstrapping procedure. (Hwang & Kang, 2022).

Results

Measurement Model Evaluation

The measurement model was evaluated to ensure that the indicators used in this study had adequate validity and reliability for representing the latent construct. The measurement model evaluation included analyses of outer loadings, construct reliability, convergent validity, and discriminant validity.

Outer loading is used to assess the strength of the relationship between the indicators and the construct being measured. Generally, the recommended outer loading value is above 0.70. The analysis results show that most indicators have outer loading values above this threshold, indicating they can adequately reflect the research construct. However, one indicator of Islamic Financial Literacy (IFL6) had a loading value of 0.353, which did not meet the indicator validity criteria and was therefore excluded from the model. After removing the invalid indicator, the measurement model was re-estimated to ensure the robustness of the analysis.

After eliminating this indicator, all remaining indicators showed adequate outer loading values. The results of the outer loading test are presented in Table 1.

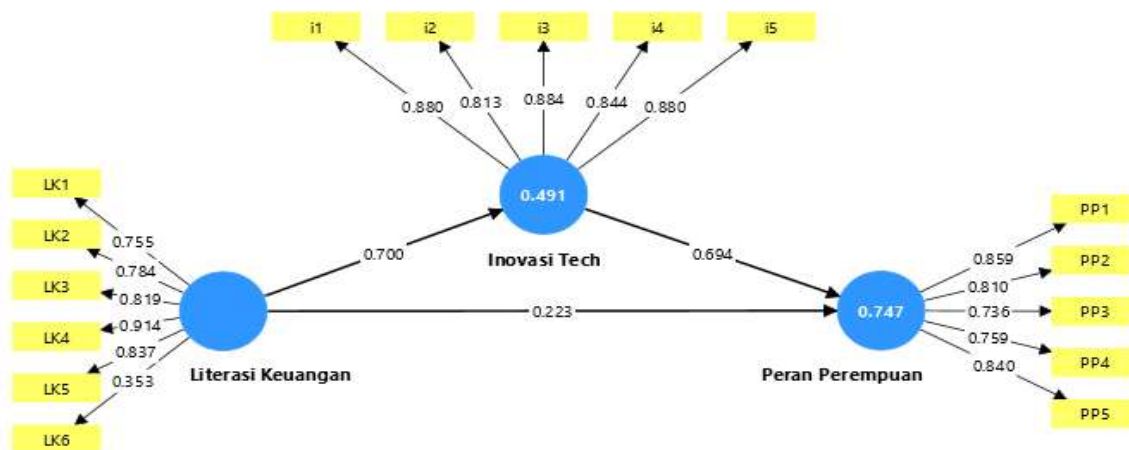
Table 1
Outer Loading of Indicators

Indicator	Technological Innovation	Financial Literacy	Women's Role
LK1		0.743	
LK2		0.810	
LK3		0.827	
LK4		0.917	
LK5		0.842	
PP1			0.859
PP2			0.811
PP3			0.735
PP4			0.760
PP5			0.840
I1	0.881		
I2	0.813		
I3	0.884		
I4	0.843		
I5	0.880		

Source: SEM PLS

As shown in Table 1, all indicators have factor loadings above 0.70, indicating good validity for measuring the research construct.

Figure 1
Outer Path test results for the research determinants



Source: SEM-PLS

Construct Reliability and Convergent Validity

Construct reliability in this study was measured using Cronbach's Alpha and Composite Reliability, while convergent validity was evaluated using the average variance extracted (AVE). A construct is considered reliable if it has a Cronbach's Alpha and Composite Reliability value above 0.70, as well as an AVE value above 0.50.

The results of the reliability and convergent validity tests are presented in Table 2.

Table 2.
Construct Reliability and Convergent Validity

Construct	Cronbach's Alpha	Composite Reliability	AVE
Technological Innovation	0.912	0.934	0.740
Financial Literacy	0.886	0.917	0.689
Role of Women	0.860	0.900	0.644

Source: SEM-PLS

As shown in Table 2, all constructs have Cronbach's Alpha values and Composite Reliability above 0.80, indicating a very high level of internal consistency. Additionally, the AVE values for all constructs are above 0.50, indicating that the constructs explain more than 50% of the variance in their respective indicators. Thus, the research model meets the criteria for convergent validity.

Discriminant Validity

Discriminant validity aims to ensure that each construct in the research model is clearly distinct from the others. The test was conducted using the Fornell-Larcker criteria.

The results of the discriminant validity test are presented in Table 3.

Table 3.
Discriminant Validity (Fornell-Larcker Criterion)

Construct	Technological Innovation	Financial Literacy	Women's Role
Technological Innovation	—		
Financial Literacy	0.745	—	
Women's Role	0.954	0.784	—

Source: SEM-PLS

The correlation values between constructs shown in Table 3 indicate that each construct has a distinct conceptual relationship with the others. These results suggest that the research model meets the criteria for discriminant validity, meaning each latent variable can be considered a distinct construct empirically.

Model Fit Evaluation

Model fit evaluation was conducted to assess the extent to which the research model represents the relationships among variables in the empirical data. Several indicators used in the model fit evaluation include the Standardized Root Mean Square Residual (SRMR) and the Normed Fit Index (NFI). The results of the model fit test are presented in Table 4.

Table 4.
Model Fit Indices

Indicator	Value
SRMR	0.076
d_ ULS	0.700
d_ G	0.434
Chi-square	152.285
NFI	0.803

Source: SEM-PLS

The SRMR value of 0.076 indicates a good fit, as it is below the recommended maximum (0.08). Additionally, the NFI value of 0.803 indicates that the model has an adequate fit for explaining the relationships among the constructs under study.

Structural Model Evaluation

The structural model was evaluated by examining the coefficient of determination (R^2) to assess the ability of the independent variables to explain the dependent variable. The results of the R^2 test are presented in Table 5.

Table 5.
Coefficient of Determination (R^2)

Endogenous Variables	R^2	Adjusted R^2
Technological Innovation	0.478	0.469
Role of Women	0.745	0.737

Source: SEM-PLS

As shown in Table 5, the financial literacy variable explains 47.8% of the variation in technological innovation. This indicates that financial literacy plays a significant role in driving the adoption of technological innovation.

Furthermore, the financial literacy and technological innovation variables together account for 74.5% of the variation in women's roles. This value indicates that the research model has high explanatory power, meaning the variables used in this study make a substantial contribution to explaining the dynamics of women's roles in economic activities.

Effect Size Analysis

Effect size analysis (f^2) was used to measure the magnitude of each independent variable's contribution to the dependent variable.

Table 6.
Effect Size (f^2)

Variable Relationship	f^2
Islamic Financial Literacy → Technological Innovation	0.915
Technological Innovation → Women's Role	1.014
Islamic Financial Literacy → Women's Role	0.092

Source: SEM-PLS

The results in Table 6 show that technological innovation has a very strong influence on women's roles, whereas the direct influence of financial literacy on women's roles is relatively

smaller. These findings indicate that technological innovation plays a strategic role in strengthening women's contributions to economic activities.

Hypothesis Testing

Hypothesis testing was conducted using the bootstrapping procedure, taking into account the t-statistic and p-value. A relationship is considered significant if the t-statistic is greater than 1.96 and the p-value is less than 0.05. The results of the hypothesis testing are presented in Table 7.

Table 7.
Hypothesis Testing Results

Variable Relationships	Coefficient	T-statistic	P-value
Technological Innovation → Role of Women	0.703	8.834	p < 0.001
Islamic Financial Literacy → Technological Innovation	0.691	7,824	p < 0.001
Islamic Financial Literacy → Women's Role	0.211	2,318	p = 0.021

Source: SEM-PLS

The analysis results show that all relationships between variables are statistically significant at the 5% level ($p < 0.05$), with most demonstrating higher significance ($p < 0.001$). Technological innovation has a positive and significant effect on women's roles, indicating that higher adoption levels are associated with stronger contributions by women to economic activities.

Additionally, Islamic financial literacy has been shown to influence technological innovation positively. This finding indicates that improved financial understanding can enhance individuals' ability to adopt and utilize technology in economic activities. Meanwhile, Islamic financial literacy also has a positive effect on women's roles, although with a relatively smaller coefficient compared to the effect of technological innovation.

Mediation Effect Analysis

This study also examines the role of technological innovation as a mediating variable in the relationship between financial literacy and women's roles. The results of the mediation effect test are presented in Table 8.

Table 8.
Indirect Effect

Variable Relationship	Coefficient	T-statistic	P-value
Islamic Financial Literacy → Technological Innovation → Women's Role	0.486	6.201	0.000

Source: SEM-PLS

The results of the analysis indicate that technological innovation significantly mediates the relationship between Islamic financial literacy and women's roles. A mediation coefficient of 0.486 suggests that increased financial literacy not only has a direct effect on women's roles but also strengthens those roles through increased technological innovation.

These findings confirm that technological innovation is a crucial mechanism linking Islamic financial literacy to the expansion of women's roles in economic activities.

Discussion

The Role of Financial Literacy in Driving Technological Innovation

The research results show that Islamic financial literacy has a positive and significant influence on technological innovation capabilities among millennial female micro-entrepreneurs. These findings indicate that Islamic financial literacy is not only related to an individual's ability to manage financial resources but also enhances entrepreneurs' capacity to make more rational economic decisions, including leveraging technology to support business development. Entrepreneurs with higher levels of financial literacy tend to have a better understanding of the benefits of technology in improving business operational efficiency, expanding market access, and boosting economic productivity. (Prithu Sarkar & Ravindra Gharpure, 2024; Vidya Kishan Alva & Dr. Kusum Thantry Dsa, 2024).

These findings align with various studies indicating that financial literacy is a key factor influencing an individual's ability to manage business activities more effectively and adaptively in response to changes in the business environment. Financial literacy enables business owners to assess economic risks and opportunities more accurately, thereby encouraging them to be more open to utilizing technology in their business activities. (Prithu Sarkar & Ravindra Gharpure, 2024; Vidya Kishan Alva & Dr. Kusum Thantry Dsa, 2024).

Furthermore, the findings of this study are consistent with research on technology adoption in micro and small businesses, which indicates that the use of digital technologies such as social media for marketing, online platforms, and digital payment systems can enhance operational efficiency and expand market reach. Digital technology enables business owners to manage business activities more effectively and enhance interaction with consumers. (Prithu Sarkar & Ravindra Gharpure, 2024; Vidya Kishan Alva & Dr. Kusum Thantry Dsa, 2024).

In the context of women's entrepreneurship, the use of technology plays an even more strategic role as it can help overcome various limitations in access to markets and business networks. Digital platforms allow women to run their businesses more flexibly and increase their contributions to household and community economic activities. (Debora Silvia Hutagalung, 2025; Siregar, 2024).

This finding confirms that Islamic financial literacy serves as a form of cognitive capital, enabling entrepreneurs to understand financial opportunities and evaluate technological investments more effectively. Improving financial literacy among female entrepreneurs not only enhances business management but also strengthens their ability to adopt technological innovations that improve business sustainability. (Prithu Sarkar & Ravindra Gharpure, 2024; Vidya Kishan Alva & Dr. Kusum Thantry Dsa, 2024).

The Impact of Technological Innovation on Strengthening the Role of Millennial Women

Research findings indicate that technological innovation capabilities have a positive and significant impact on strengthening women's roles in economic activities. These findings suggest that the utilization of digital technology provides greater opportunities for women to increase their participation in productive economic activities. Digital technologies, such as social media, e-commerce platforms, and digital payment systems, enable entrepreneurs to develop their businesses more flexibly and expand their market reach without being constrained by

geographical barriers or business network limitations. (Arbaina Mayasari et al., 2024; Asmara et al., 2023).

In the context of microenterprises, the use of technology enables women to improve operational efficiency, expand marketing networks, and strengthen their position within family economic activities. Access to digital technology also provides opportunities for women to manage their businesses more independently and increase their contribution to household income. These findings align with various studies indicating that women's participation in productive economic activities can strengthen family well-being and enhance household economic resilience. (Prithu Sarkar & Ravindra Gharpure, 2024; Vidya Kishan Alva & Dr. Kusum Thantry Dsa, 2024).

Furthermore, the use of digital technology can also be understood as a key factor in the process of women's economic empowerment. Access to economic resources, including technology and market information, enables women to enhance their capacity for making economic decisions and strengthen their position in entrepreneurial activities. (Prithu Sarkar & Ravindra Gharpure, 2024; Vidya Kishan Alva & Dr. Kusum Thantry Dsa, 2024).

The findings of this study are also consistent with previous studies indicating that digital technology plays a crucial role in expanding economic opportunities for women, particularly in the micro- and small-business sectors. The use of digital platforms enables women entrepreneurs to reach broader markets, enhance consumer engagement, and develop their businesses more sustainably. (Debora Silvia Hutagalung, 2025; Siregar, 2024).

Thus, technological innovation can be viewed as a vital instrument in strengthening the economic role of millennial women. The ability to leverage digital technology not only enhances business efficiency but also expands economic opportunities and strengthens women's capacity to take on more active roles in family and community economic activities. (Debora Silvia Hutagalung, 2025; Siregar, 2024).

The Influence of Islamic Financial Literacy on Women's Roles

Research findings indicate that Islamic financial literacy has a positive and significant influence on women's roles in economic activities. However, the relatively small magnitude of the influence coefficient compared to the impact of technological innovation suggests that financial literacy serves as a supporting factor in strengthening women's economic capacity but has not yet become the primary factor directly determining the enhancement of such roles.

Financial literacy significantly enhances women's ability to manage economic resources, plan business activities, and make more rational economic decisions. Better financial understanding enables female entrepreneurs to manage business income more effectively and improve their businesses' sustainability. In the context of micro-entrepreneurship, financial management capacity is one of the factors supporting the enhancement of women's economic independence (Prithu Sarkar & Ravindra Gharpure, 2024; Vidya Kishan Alva & Dr. Kusum Thantry Dsa, 2024).

Nevertheless, the findings of this study also indicate that financial literacy alone is not sufficient to strengthen women's role in economic activities directly. The strengthening of women's economic role is also influenced by other, more operational factors, such as access to technology, market information, and broader economic opportunities. Therefore, financial

literacy is better understood as *an enabling factor* that enhances women's economic capacity; however, its impact is significantly stronger when combined with other factors that support entrepreneurial activities. (Prithu Sarkar & Ravindra Gharpure, 2024; Vidya Kishan Alva & Dr. Kusum Thantry Dsa, 2024).

These findings reinforce the argument that women's economic empowerment is determined not only by increased individual capacity but also by access to broader economic resources. When financial literacy is combined with technology use and greater market access, women entrepreneurs have greater opportunities to increase their contributions to family and community economic activities. (Prithu Sarkar & Ravindra Gharpure, 2024; Vidya Kishan Alva & Dr. Kusum Thantry Dsa, 2024).

The Mediating Role of Technological Innovation in the Relationship Between Financial Literacy and Women's Roles

Research results indicate that technological innovation capabilities significantly mediate the relationship between Islamic financial literacy and women's roles in economic activities. These findings suggest that improved financial literacy not only directly strengthens women's economic roles but also indirectly reinforces them by enhancing their ability to use technology in business activities.

An interpretation of these findings suggests that individuals with higher levels of financial literacy tend to have a greater ability to understand the economic benefits of technology and integrate it into business activities. Adequate financial understanding enables business actors to assess the opportunities and risks of technology use, thereby encouraging the adoption of innovations that can improve operational efficiency and expand market access. (Arbaina Mayasari et al., 2024; Asmara et al., 2023).

In the context of women's entrepreneurship, the ability to leverage digital technology is a key factor in expanding economic opportunities and increasing women's participation in productive economic activities. The use of digital technology enables women entrepreneurs to conduct business activities more flexibly, expand their marketing networks, and increase their economic contributions to family well-being. (Prithu Sarkar & Ravindra Gharpure, 2024; Vidya Kishan Alva & Dr. Kusum Thantry Dsa, 2024).

These findings indicate that technological innovation serves as a transformational mechanism linking financial literacy with increased economic participation among women. In other words, financial literacy provides the cognitive foundation for rational economic decision-making, while the use of technology enables that capacity to translate into more productive entrepreneurial practices. (Debora Silvia Hutagalung, 2025; Siregar, 2024).

Thus, the findings of this study make an important contribution to the literature on women's economic empowerment by demonstrating that integrating financial literacy and technological innovation can be an effective strategy for strengthening women's economic capacity. The synergy between improved financial literacy and the use of digital technology has the potential to drive the development of more inclusive, productive, and sustainable women's entrepreneurship. (Prithu Sarkar & Ravindra Gharpure, 2024; Vidya Kishan Alva & Dr. Kusum Thantry Dsa, 2024).

Theoretical and Conceptual Implications

This study makes several theoretical contributions to the literature on women's economic empowerment, financial literacy, and technological innovation in the context of micro and small enterprises.

First, this study expands the discourse on women's economic empowerment by demonstrating that financial literacy and technological innovation are two complementary factors in strengthening women's participation in economic activities. These findings underscore that enhancing individual capacity through financial literacy must be accompanied by access to productive resources, including digital technology, so that women can participate more effectively in economic activities. (Prithu Sarkar & Ravindra Gharpure, 2024; Vidya Kishan Alva & Dr. Kusum Thantry Dsa, 2024).

Second, this study contributes to the financial literacy literature by demonstrating that financial literacy not only directly influences economic decision-making but also enhances individuals' ability to use technology to support business activities. Thus, financial literacy can be understood as cognitive capital that encourages individuals to identify economic opportunities and utilize technological innovations more effectively. (Arbaina Mayasari et al., 2024; Asmara et al., 2023).

Third, this study enriches the literature on technological innovation in micro-entrepreneurship by demonstrating that digital technology can serve as a strategic instrument in strengthening women's economic empowerment. The utilization of digital technology enables women entrepreneurs to expand market access, improve business efficiency, and strengthen their economic contributions to family and community well-being. (Debora Silvia Hutagalung, 2025; Siregar, 2024).

Conceptually, this study indicates that integrating financial literacy with technological innovation capabilities is a key factor in increasing women's economic participation. These findings provide a more comprehensive understanding of the mechanisms linking financial knowledge capacity with the strengthening of women's roles in modern economic activities.

Conclusion

The findings highlight that strengthening Islamic financial literacy among women micro-entrepreneurs can be an important strategy for enhancing technology adoption and improving women's economic participation. The analysis results indicate that financial literacy has a positive and significant influence on technological innovation, suggesting that improved financial understanding can enhance individuals' ability to adopt and utilize technology in economic activities. Furthermore, technological innovation was found to have a strong positive influence on women's roles, suggesting that the utilization of technology can expand economic opportunities and increase women's participation in business activities. Financial literacy also directly influences women's roles, though with a relatively weaker effect than technological innovation.

Furthermore, this study found that technological innovation significantly mediates the relationship between financial literacy and women's economic roles. This finding suggests that financial literacy not only directly enhances women's economic capacity but also strengthens these roles by enabling them to adopt technological innovations. Thus, the integration of

financial literacy and technology use is a critical factor in promoting women's economic empowerment, particularly in micro and small enterprises.

Theoretically, this study contributes to the literature on women's economic empowerment by demonstrating that financial literacy and technological innovation are complementary factors in enhancing women's economic participation. From a practical perspective, the study's findings suggest that financial literacy enhancement programs should be integrated with digital capacity-building to enable women entrepreneurs to use technology effectively in developing their economic activities.

From a policy perspective, these findings provide important implications for local governments, particularly the Cooperative and MSME Office in Bandar Lampung. Given that technological innovation plays a significant mediating role, policy interventions should prioritize enhancing digital capabilities among women micro-entrepreneurs. This can be achieved through targeted digital literacy programs, training in the use of e-commerce platforms and digital financial services, and facilitating access to technological infrastructure. Furthermore, integrating Islamic financial literacy into digital empowerment programs is essential to ensure that women entrepreneurs not only adopt technology but also apply it in ways consistent with Sharia principles. Such integrated policies can strengthen women's economic participation and support the development of inclusive and sustainable microenterprise ecosystems.

Nevertheless, this study has several limitations, particularly regarding the scope of the sample and the limited research variables. Therefore, future research is recommended to expand the study's geographical scope and consider other variables that may influence women's economic empowerment, such as access to financing, institutional support, and social and cultural factors. A more diverse methodological approach could also be employed to gain a more comprehensive understanding of the dynamics of women's roles in economic activities during the digital transformation era.

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Author Contributions Statement

R. contributed to the conceptualization of the study, data collection, formal analysis, and manuscript drafting. I was responsible for research design, methodology development, and supervision of the overall study. Q.A. contributed to data validation, statistical analysis, and interpretation of the results. I.N. was involved in literature review, manuscript editing, and final

revision of the article. All authors have read and approved the final version of the manuscript and agreed to be accountable for all aspects of the work.

Conflict of Interest

The authors declare that there are no conflicts of interest regarding the publication of this article. The authors confirm that this research was conducted without any commercial or financial relationships that could be construed as a potential conflict of interest.

Furthermore, the authors affirm that there are no personal, professional, or institutional affiliations that may have influenced the research outcomes or the interpretation of the findings presented in this study.

AI Usage Statement

The authors declare that artificial intelligence (AI) tools were used solely to support language refinement, grammar checking, and improvement of the clarity of expression in this manuscript. The use of AI was limited to editorial assistance and did not involve generating original scientific content, analyzing data, interpreting results, or formulating conclusions. All intellectual contributions, including the research design, data collection, data analysis, and interpretation of findings, were conducted entirely by the authors. The authors take full responsibility for the accuracy, integrity, and originality of the content presented in this manuscript.

The authors have carefully reviewed and validated all outputs generated with the assistance of AI tools to ensure compliance with academic integrity, ethical standards, and the journal's publication policies. No AI tools were used in a manner that would compromise the authenticity or reliability of the research. This disclosure is made in accordance with current academic publishing guidelines regarding the responsible and transparent use of artificial intelligence in scholarly work.

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