

THE ISLAMIC FINTECH INCLUSION PARADOX: HOW SHARIA COMPLIANCE LITERACY MODERATES THE EFFECT OF ACTUAL ISLAMIC FINTECH USAGE ON MEANINGFUL FINANCIAL INCLUSION AMONG GENERATION Z

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Abstract: Islamic financial technology has expanded access to Sharia-compliant payments, financing, investment, crowdfunding, and social-finance services, particularly among digitally native Generation Z. Yet access and transaction frequency do not necessarily produce responsible use, financial resilience, or improved welfare. This study develops the Islamic fintech inclusion paradox to explain how intensive use may coexist with shallow financial capability when users do not adequately understand Sharia principles, contractual structures, fees, risks, and consumer obligations. It examines the effect of actual Islamic fintech usage on meaningful financial inclusion and the moderating role of Sharia compliance literacy. Meaningful financial inclusion is conceptualised as effective, responsible, sustained, and welfare-enhancing use of formal Sharia-compliant financial services rather than mere account ownership or transaction frequency. Using a cross-sectional survey dataset of 410 Generation Z users, the PLS-SEM analysis shows that actual Islamic fintech usage positively predicts meaningful financial inclusion ($\beta = 0.468$, $p < 0.001$), Sharia compliance literacy has a positive direct effect ($\beta = 0.332$, $p < 0.001$), and the interaction between usage and literacy is positive and significant ($\beta = 0.149$, $p < 0.001$). Simple-slope analysis indicates that the contribution of usage increases from 0.319 at low literacy to 0.617 at high literacy. The model explains 44.2% of the variance in meaningful financial inclusion and demonstrates positive predictive relevance ($Q^2_{\text{predict}} = 0.423$). The findings support a capability-based interpretation of Islamic fintech inclusion and reinforce practical recommendations for literacy-by-design, transparent contract communication, Sharia assurance, suitability safeguards, and outcome-based inclusion indicators for providers, regulators, and educational institutions.

Keywords: Islamic fintech; meaningful financial inclusion; Sharia compliance literacy; Generation Z; financial capability

1. Introduction

1.1 Background of the Problem

Financial technology has altered the economics of access to payments, financing, savings, investment, insurance, and remittance services. Digital platforms reduce geographic and transaction barriers, offer continuous availability, and enable providers to serve customers who were previously costly to reach through branch-based models. In the Islamic finance context, fintech also creates an opportunity to connect technological convenience with the ethical and contractual requirements of Sharia, including the avoidance of *riba*, *gharar*, *maysir*, deception, and unjust enrichment. The Islamic fintech literature has consequently expanded from discussions of digital payments and peer-to-peer financing to crowdfunding, blockchain, zakat, waqf, investment platforms, and digital Islamic banking (Alshater et al., 2022; Alsaghir, 2023).

Indonesia provides a particularly important setting. It combines a large Muslim population, rapid digital payment growth, an expanding Islamic finance ecosystem, and a young population whose everyday financial behaviour is increasingly mediated by mobile applications. The 2020 Population Census defines Generation Z as people born between 1997 and 2012; this cohort represents a major segment of Indonesia's population and future workforce (Badan Pusat Statistik [BPS], 2021). Bank Indonesia has documented continued growth in mobile, internet, and QR-based payments, while the Financial Services Authority has simultaneously emphasized that digital access must be accompanied by literacy and consumer protection (Bank Indonesia, 2025; Otoritas Jasa Keuangan [OJK], 2024).

The national evidence also reveals a structural mismatch between access and understanding. OJK's 2024 survey reported a national financial literacy index of 65.43% and a financial inclusion index of 75.02%. For Islamic finance, the gap is more pronounced: Islamic financial literacy was reported at 39.11%, whereas Islamic financial inclusion was 12.88% (OJK, 2024). These figures should not be read as a simple linear sequence in which more accounts automatically generate better outcomes. Rather, they show that access, knowledge, and actual use can move at different speeds. The quality of inclusion therefore depends on whether users can understand products, judge risks, select appropriate contracts, sustain beneficial behaviour, and avoid harmful debt or speculative decisions.

Generation Z is often assumed to be naturally competent in digital finance because of frequent smartphone use. Digital familiarity, however, is not equivalent to financial capability or Sharia understanding. A user may be comfortable navigating an interface while remaining unable to distinguish *murabahah* from *qard*, identify the economic consequences of fees and late-payment clauses, assess Sharia governance, understand data-sharing risks, or evaluate whether a financing product fits their repayment capacity. Recent Indonesian studies show that performance expectancy, compatibility, trust, religiosity, and financial literacy shape intentions to adopt Islamic mobile payments and digital Islamic services (Saputro & Hati, 2021; Muttaqien et al., 2025). Yet adoption and intention are intermediate outcomes. The more consequential question is whether actual use improves the user's capacity, resilience, and welfare.

This distinction motivates the concept of meaningful financial inclusion. The Global Findex framework increasingly differentiates between account ownership, use, saving, borrowing, payments, and resilience, while the capability approach evaluates development by the real freedoms and capabilities people obtain from resources rather than the resources alone (Demirgüç-Kunt et al., 2022; Sen, 1999). Applied to Islamic fintech, meaningful inclusion

means that digital access is converted into effective, responsible, sustained, and welfare-enhancing financial participation. The concept therefore goes beyond counting registered users or transaction frequency and asks whether services help users manage liquidity, build savings, access suitable financing, reduce vulnerability, and make decisions consistent with both their financial interests and Sharia commitments.

Conceptually, meaningful financial inclusion is distinct from access, usage intensity, customer satisfaction, and subjective financial well-being. Access is a prerequisite and usage reflects activity, whereas meaningful inclusion evaluates whether financial services are used in ways that are appropriate, informed, durable, and capable of improving financial functioning. In this study, the construct is organised around four content domains: effective use (using services for substantive financial needs), responsible use (understanding costs, risks, obligations, and product suitability), sustained use (continuity without avoidable financial distress), and welfare-enhancing use (supporting liquidity management, saving, resilience, and reduced vulnerability). This domain specification is grounded in the capability approach and the financial-inclusion and resilience literature (Sen, 1999; Demirgüç-Kunt et al., 2022; Grohmann et al., 2018; Banna, 2025).

1.2 Main Problem and Research Gap

The central problem is therefore an inclusion paradox: high Islamic fintech use can coexist with limited financial capability and weak welfare outcomes. The paradox is expected to be most visible among users who transact frequently but possess limited Sharia compliance literacy. Conversely, users who understand contracts, risks, rights, and Sharia principles should be better able to transform digital access into meaningful inclusion.

The proposed mechanism is also distinct from a purely conventional-fintech explanation. General financial or digital literacy may help users evaluate costs, security, and suitability, but Islamic fintech adds a compliance layer involving the substance of the contract, prohibited elements, Sharia governance, and the alignment between product claims and actual contractual features. Accordingly, Sharia compliance literacy is theorised as a context-specific conversion factor rather than a substitute for general financial literacy. A direct comparison with conventional fintech users would therefore be valuable for testing the incremental explanatory value of this Sharia-specific capability.

1.3 Hypothesis Development

H1: Actual Islamic fintech usage has a positive effect on meaningful financial inclusion among Generation Z.

H2: Sharia compliance literacy has a positive effect on meaningful financial inclusion among Generation Z.

H3: Sharia compliance literacy positively moderates the relationship between actual Islamic fintech usage and meaningful financial inclusion, such that the relationship is stronger at higher levels of literacy.

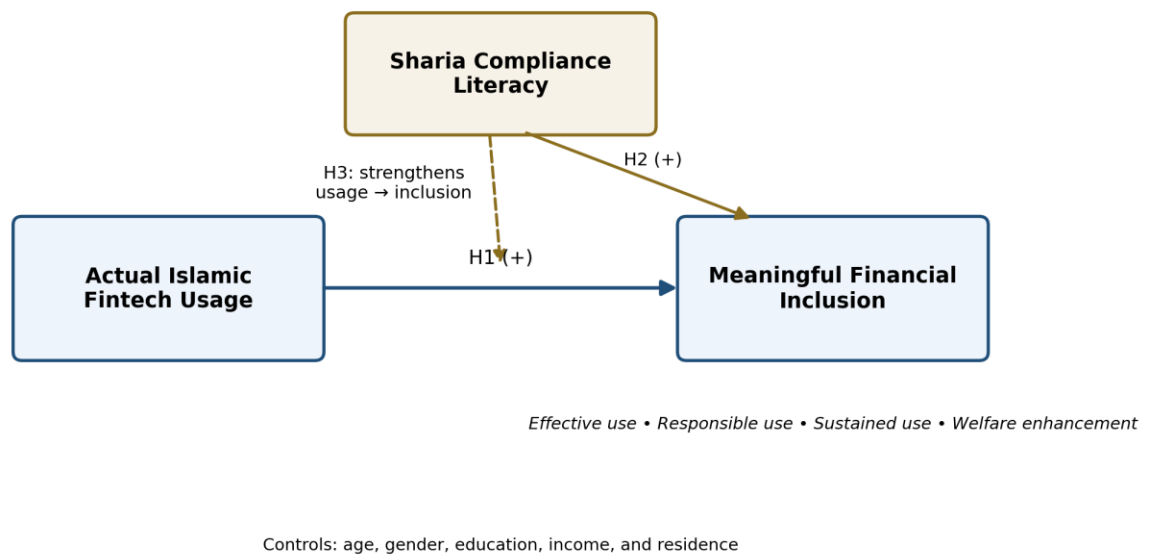


Figure 1. Conceptual framework

2. Method

2.1 Research Approach and Method

The study uses a positivist, explanatory, quantitative approach with a cross-sectional survey design. The unit of analysis is the individual Generation Z user of Islamic fintech. The model estimates the direct effects of actual Islamic fintech usage and Sharia compliance literacy on meaningful financial inclusion, together with the interaction effect between usage and literacy. Partial least squares structural equation modelling (PLS-SEM) is used because the study is prediction-oriented, includes a moderation term, and evaluates a relatively new outcome construct. PLS-SEM is appropriate for complex predictive models and is less restrictive regarding multivariate normality than covariance-based SEM (Hair et al., 2022).

2.2 Population, Sample, Time, and Research Setting

The target population consists of Indonesian Muslim Generation Z individuals, defined as those born from 1997 to 2012, who are at least 18 years old at the time of data collection and have used at least one Sharia-compliant digital financial service during the preceding six months. Eligible services include Islamic mobile banking, Sharia-compliant e-wallet or payment features, Islamic peer-to-peer financing, digital Islamic investment, crowdfunding, takaful platforms, and digital zakat or waqf services when these involve a formal financial transaction.

The empirical analysis uses the final tabulated survey dataset supplied for the study. The file contains 410 completed records for respondents aged 18-29 years, with demographic controls and complete item-level responses for AU1-AU5, SCL1-SCL8, and MFI1-MFI8. The study follows the purposive eligibility framework specified for Indonesian Muslim Generation Z users who had used at least one Sharia-compliant digital financial service during the preceding six months. The final tabulation is treated as the analytical sample for the cross-sectional model.

2.3 Operational Definitions and Measurement

All focal constructs are measured using a five-point Likert scale. Actual usage items range from 1 (very low/never) to 5 (very high/very often), while literacy and inclusion items range from 1 (strongly disagree) to 5 (strongly agree).

Table 1. Construct operationalization

Construct	Code	Operational domain	Main adaptation sources
Actual Islamic fintech usage (AU)	AU1-AU5	Frequency, continuity, functional breadth, active financial management, and use for substantive needs.	Venkatesh et al. (2012); Saputro & Hati (2021); Askandar et al. (2026)
Sharia compliance literacy (SCL)	SCL1-SCL8	Recognition of prohibited elements; contract knowledge; fee/return interpretation; Sharia governance; risk, rights, and claim verification.	Alfarizi & Ngatindriatun (2022); Muttaqien et al. (2025); Alsaghir (2023)
Meaningful financial inclusion (MFI)	MFI1-MFI8	Outcome-oriented conversion of access into: (1) effective use for substantive needs; (2) responsible use based on cost, risk, obligation, and suitability awareness; (3) sustained use without avoidable financial distress; and (4) welfare-enhancing use supporting liquidity, saving, resilience, and reduced vulnerability.	Demirgüç-Kunt et al. (2022); Sen (1999); Grohmann et al. (2018); Banna (2025)

2.4 Construct Development and Content Validation

Meaningful financial inclusion (MFI) is a newly assembled outcome construct and is therefore specified more narrowly than conventional access or usage indicators. Content validity is addressed through deductive domain specification and item-to-domain mapping based on four dimensions: effective use, responsible use, sustained use, and welfare-enhancing use. These domains are grounded in the capability approach, Global Findex dimensions, financial-literacy research, and Islamic-finance context. The eight retained MFI indicators were evaluated empirically for indicator reliability, internal consistency, convergent validity, and discriminant validity. Because the supplied tabulation does not contain a separate expert-rating or pilot-testing dataset, the study reports literature-based content specification and empirical construct validation rather than claiming a formal content-validity index. Future replications should complement this procedure with multi-expert CVI assessment and cognitive pretesting (Hinkin, 1998; Polit et al., 2007).

2.5 Data Analysis Technique

The analysis proceeds in six stages. First, the supplied dataset is screened for missing values, duplicate identifiers, out-of-range construct responses, and implausible patterns. Second, respondent and construct distributions are described. Third, the measurement model is assessed using indicator loadings, Cronbach's alpha, composite reliability, average variance

extracted (AVE), and heterotrait-monotrait ratios (HTMT). Recommended thresholds are loadings generally above 0.708, reliability between 0.70 and 0.95, AVE above 0.50, and HTMT below 0.85 or 0.90 (Fornell & Larcker, 1981; Henseler et al., 2015).

Fourth, collinearity is examined using variance inflation factors. Fifth, the structural model is evaluated using standardized path coefficients, 5,000 nonparametric bootstrap resamples, percentile confidence intervals, coefficient of determination (R^2), effect sizes (f^2), and predictive relevance. The interaction term is created from standardized actual-usage and literacy scores. Simple-slope analysis estimates the usage effect at low (-1 SD), mean, and high (+1 SD) literacy. Finally, a median-split quadrant analysis is used descriptively to compare high-use-high-literacy, high-use-low-literacy, low-use-high-literacy, and low-use-low-literacy groups. The quadrant analysis supplements rather than replaces the continuous interaction test.

All numerical results reported in Sections 3-5 were recalculated from the 410-case item-level dataset supplied for the study. The focal constructs are estimated from their respective multi-item blocks, the structural coefficients are standardized, and statistical inference is based on 5,000 bootstrap resamples. The supplementary appendix reports the corresponding measurement, discriminant-validity, collinearity, structural, predictive, and moderation statistics used in the manuscript.

Common-method bias is considered through both procedural and statistical assessment. The empirical item set was evaluated using a single-factor diagnostic and collinearity checks. The first unrotated factor accounted for 40.4% of total item variance, below the majority threshold, and all structural VIF values were close to 1.0. These tests cannot eliminate common-method bias, but they provide no indication that a single method factor dominates the model. Because cross-sectional self-report data cannot establish causality, results are interpreted as predictive associations rather than definitive causal effects (Podsakoff et al., 2003).

3. Results

3.1 Data Screening and Respondent Profile

The final dataset contained 410 records and 27 variables, including respondent controls, five actual-usage indicators, eight Sharia-compliance-literacy indicators, and eight meaningful-financial-inclusion indicators. No missing values were found in the 21 construct indicators, all construct responses were within the specified five-point scale, and all 410 records were retained for the focal empirical analysis. Respondent ages ranged from 18 to 29 years ($M = 23.1$, $SD = 3.3$), which is consistent with the adult Generation Z focus of the study.

3.2 Descriptive Statistics and Common Method Assessment

The mean score was 2.991 for actual Islamic fintech usage, 2.913 for Sharia compliance literacy, and 2.992 for meaningful financial inclusion on a five-point scale. Actual usage was moderately correlated with meaningful inclusion ($r = 0.540$), while literacy was moderately correlated with meaningful inclusion ($r = 0.449$). The correlation between usage and literacy was lower ($r = 0.202$), indicating that frequent Islamic fintech use and Sharia-compliance knowledge are related but empirically distinct characteristics.

Table 2. Descriptive statistics

Construct	Mean	SD	Minimum	Maximum
Actual Islamic fintech usage	2.991	0.634	1.200	4.600
Sharia compliance literacy	2.913	0.627	1.000	4.750
Meaningful financial inclusion	2.992	0.627	1.375	4.875

Inner-model VIF values were low for the focal predictors ($AU = 1.047$; $SCL = 1.063$; $AU \times SCL = 1.026$). The VIF values for age, gender, education, income, and residence were also close to 1.0. These results indicate that multicollinearity does not materially distort the structural estimates.

3.3 Measurement Model

Table 3. Reliability and convergent validity

Construct	Indicators	Loading range	Cronbach α	Composite reliability	AVE
Actual Islamic fintech usage	AU1-AU5	0.796-0.847	0.881	0.913	0.677
Sharia compliance literacy	SCL1-SCL8	0.764-0.845	0.919	0.934	0.638
Meaningful financial inclusion	MFI1-MFI8	0.785-0.825	0.924	0.938	0.653

All indicator loadings exceeded 0.70, ranging from 0.764 to 0.847. Cronbach's alpha ranged from 0.881 to 0.924, composite reliability from 0.913 to 0.938, and AVE from 0.638 to 0.677, supporting internal consistency and convergent validity. HTMT values were 0.225 for AU-SCL, 0.599 for AU-MFI, and 0.487 for SCL-MFI. All values are below the conservative 0.85 criterion, supporting discriminant validity among the three constructs.

3.4 Structural Model and Hypothesis Testing

The structural model explained 44.2% of the variance in meaningful financial inclusion ($R^2 = 0.442$; adjusted $R^2 = 0.430$). Ten-fold out-of-sample prediction produced $Q^2_{\text{predict}} = 0.423$, with $RMSE = 0.759$ and $MAE = 0.598$ for the standardized MFI score, indicating positive predictive relevance. Actual usage, Sharia compliance literacy, and their interaction all had positive coefficients. Income showed a small positive control effect ($\beta = 0.088$, $p = 0.019$), while age, gender, education, and residence were not statistically significant.

Table 4. Structural model results

Hypothesis	Path	β	SE	t	p	f ²	Decision
H1	Actual usage $\rightarrow$ meaningful inclusion	0.468	0.039	12.102	<0.001	0.375	Supported
H2	Sharia literacy $\rightarrow$ meaningful inclusion	0.332	0.037	9.061	<0.001	0.186	Supported
H3	Actual usage $\times$ Sharia literacy $\rightarrow$ meaningful inclusion	0.149	0.039	3.771	<0.001	0.039	Supported

Bootstrapping used 5,000 nonparametric resamples. Two-tailed significance tests and 95% percentile confidence intervals are reported.

H1 was supported: actual Islamic fintech usage had a positive and statistically significant relationship with meaningful financial inclusion ($\beta = 0.468$, bootstrap $SE = 0.039$, $t = 12.102$, $p < 0.001$, 95% CI [0.393, 0.545], $f^2 = 0.375$). H2 was also supported: Sharia compliance

literacy positively predicted meaningful inclusion ($\beta = 0.332$, bootstrap SE = 0.037, $t = 9.061$, $p < 0.001$, 95% CI [0.261, 0.405], $f^2 = 0.186$).

H3 was supported because the interaction coefficient was positive and statistically significant ($\beta = 0.149$, bootstrap SE = 0.039, $t = 3.771$, $p < 0.001$, 95% CI [0.077, 0.232], $f^2 = 0.039$). Although the interaction effect size is small, its positive sign shows that the contribution of actual Islamic fintech usage to meaningful financial inclusion becomes stronger as Sharia compliance literacy increases.

3.5 Moderation and Inclusion-Paradox Analysis

Simple-slope analysis estimated the effect of actual usage at three literacy levels. At low literacy (-1 SD), the usage slope was 0.319. At the mean literacy level, it was 0.468. At high literacy (+1 SD), it increased to 0.617. Thus, the empirical contribution of actual Islamic fintech usage to meaningful financial inclusion is almost twice as large at high literacy as at low literacy.

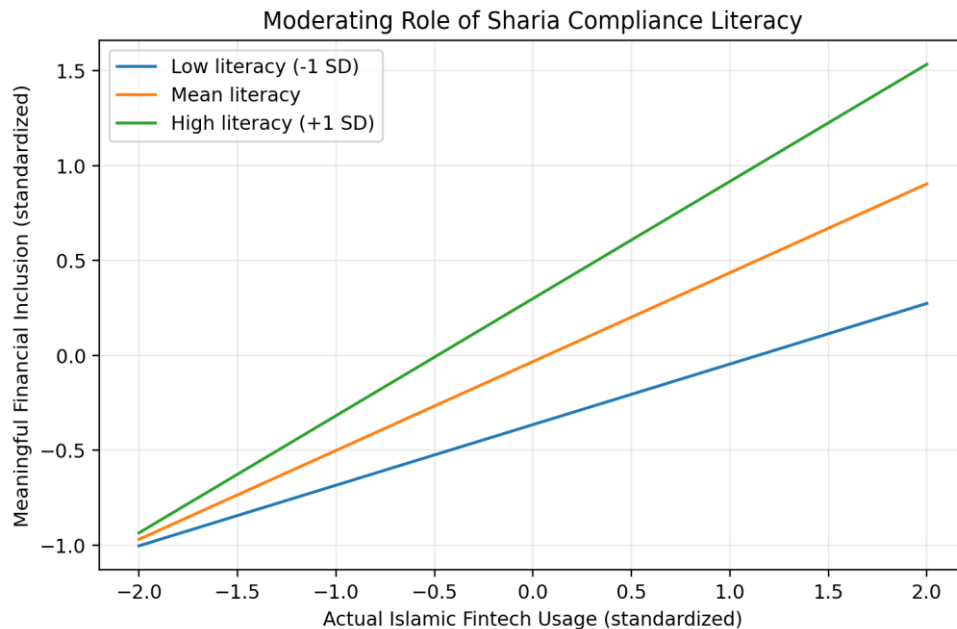


Figure 2. Moderation pattern based on the 410-case analytical dataset

Table 5. Usage–literacy quadrant comparison

Group	n	Mean MFI	SD
High use–high literacy	145	3.447	0.562
High use–low literacy	83	2.849	0.595
Low use–high literacy	92	2.789	0.477
Low use–low literacy	90	2.597	0.428

MFI = meaningful financial inclusion. Groups are created using median splits for descriptive interpretation only.

The quadrant analysis provides an intuitive empirical illustration of the inclusion paradox. The high-use-high-literacy group recorded the highest meaningful-inclusion score ($n = 145$; $M = 3.447$; $SD = 0.562$), whereas the high-use-low-literacy group scored substantially lower ($n = 83$; $M = 2.849$; $SD = 0.595$). The low-use-high-literacy group recorded $M = 2.789$ ($n = 92$; $SD = 0.477$), and the low-use-low-literacy group recorded $M = 2.597$ ($n = 90$; $SD =$

0.428). The gap between the two high-use groups shows that transaction intensity alone is not sufficient to infer meaningful inclusion; the quality of knowledge accompanying use matters for the outcome achieved.

4. Discussion

4.1 Interpretation of the Main Results

The first empirical result supports the proposition that actual Islamic fintech usage contributes to meaningful financial inclusion. The positive and comparatively large effect of usage ($\beta = 0.468$; $f^2 = 0.375$) indicates that repeated and substantive engagement with Islamic fintech can improve the extent to which Generation Z users participate in formal financial services in ways that support financial functioning. This is consistent with the general fintech mechanism whereby digital services reduce transaction costs, enable remote access, support small-value transactions, and integrate users into formal financial networks (Ozili, 2018). It also aligns with Islamic fintech research linking adoption and use with inclusion, business sustainability, and sustainable development (Alfarizi & Ngatindriatun, 2022; Askandar et al., 2026; Mohamed & Otake, 2025).

At the same time, the positive usage effect should not be interpreted as evidence that every additional digital transaction improves welfare. The MFI construct deliberately captures effective, responsible, sustained, and welfare-enhancing use. Registrations, active users, and transaction volume therefore measure reach and activity, whereas meaningful inclusion requires evidence that use improves financial functioning and resilience. The empirical quadrant pattern reinforces this distinction because respondents with similarly high usage levels achieved materially different MFI outcomes depending on their Sharia compliance literacy.

The second empirical result shows that Sharia compliance literacy has a positive direct contribution to meaningful financial inclusion ($\beta = 0.332$; $f^2 = 0.186$). This extends evidence that Islamic financial literacy shapes trust, preference, adoption, and financial outcomes (Muttapien et al., 2025; Trianto et al., 2021). Literate users are better positioned to identify suitable products, interpret contract structures, compare costs, understand risk allocation, and check Sharia oversight. The finding therefore suggests that Sharia literacy is not merely an antecedent of adoption; it is also associated with the quality of financial outcomes obtained after adoption.

The direct literacy effect also clarifies why religiosity alone is not sufficient. A highly religious user may strongly prefer Islamic products but still lack the technical knowledge required to assess contract substance. Conversely, a user may understand general finance yet fail to recognize Sharia-specific issues. Sharia compliance literacy bridges value commitment and applied decision competence. It translates the desire for compliant finance into the capacity to choose and use compliant services effectively.

4.2 Moderation and the Islamic Fintech Inclusion Paradox

The moderation hypothesis is the core theoretical finding. The positive and significant interaction ($\beta = 0.149$, $p < 0.001$) indicates that Sharia compliance literacy strengthens the conversion of fintech usage into meaningful inclusion. In capability terms, fintech is a resource or conversion opportunity, while literacy functions as a conversion factor that helps transform access into valuable functioning (Sen, 1999). In information-processing terms, literacy helps users interpret disclosures, assess fit, and respond to risk. In Islamic-finance terms, it supports alignment between actual behaviour and principles of transparency, justice, protection of

wealth, and avoidance of harm. The simple slopes support this interpretation: the usage effect rises from 0.319 at low literacy to 0.617 at high literacy.

The inclusion paradox occurs when platform activity is high but substantive outcomes remain limited. Several mechanisms can explain this condition. First, promotional incentives can generate transactions that are not tied to genuine financial needs. Second, interface simplicity may conceal contractual complexity. Third, social influence can encourage adoption without comprehension. Fourth, users may confuse an Islamic label with complete assurance and therefore reduce their own due diligence. Fifth, digital financing can increase short-term liquidity while weakening longer-term financial resilience if repayment capacity is not assessed carefully. Alsaghir (2023) warns that Islamic fintech's inclusion potential depends on risk governance and substantive compliance; Banna (2025) similarly shows that literacy can alter the consequences of digital financial inclusion in Islamic banking.

The high-use–low-literacy quadrant does not imply that low-literacy users should be discouraged from digital finance. Rather, it indicates that access should be accompanied by embedded capability-building. The appropriate response is not exclusion but literacy-by-design: education and safeguards delivered at the moment of decision, in a form that is understandable, relevant, and proportional to product risk.

4.3 Operationalising Literacy-by-Design: Practical Implementation Challenges

Literacy-by-design requires providers to place comprehension support at the point of financial decision rather than relying only on external education campaigns. Practical mechanisms include layered contract summaries; plain-language explanations of the akad, fees, profit/return basis, penalties, and key obligations; visible evidence of Sharia governance; risk and repayment-capacity prompts for financing; short comprehension checks before high-risk transactions; contextual definitions; post-transaction reminders; and direct links to complaint or escalation channels. The objective is calibrated, risk-sensitive friction: simple products should remain easy to use, while complex or potentially harmful decisions should trigger stronger disclosure and comprehension support.

Implementation is not frictionless. Additional disclosures can overload users or reduce conversion rates; contract structures differ across products; legal and Sharia explanations must remain accurate when products change; and product, compliance, Sharia-supervisory, legal, and user-experience teams must coordinate. Providers can mitigate these challenges through tiered disclosure, reusable plain-language templates, modular product-specific explanations, user testing with Generation Z, and version-controlled audit trails showing which disclosure a user saw before a transaction. Nudges should be designed to improve informed choice rather than function as dark patterns that steer users toward higher-volume or higher-margin products.

Operational evaluation should also move beyond interface metrics. Providers and regulators can track comprehension, suitability, complaints, repayment difficulty, repeated use of high-cost products, savings continuity, resilience to short-term shocks, and user-reported financial control alongside registrations and transaction volume. Such outcome-based indicators make the inclusion paradox empirically testable at the platform level and create a feedback loop between consumer capability, product governance, and Sharia assurance.

5. Conclusion

5.1 Final Findings

The study demonstrates that Islamic fintech should not be evaluated solely through access, adoption, or transaction frequency. Meaningful inclusion occurs when users can

employ formal Sharia-compliant services effectively, responsibly, continuously, and in ways that strengthen financial resilience and welfare. Based on the 410-case dataset, H1, H2, and H3 are supported: actual usage is positively associated with meaningful inclusion ($\beta = 0.468$), Sharia compliance literacy has a positive direct association ($\beta = 0.332$), and literacy positively moderates the usage-inclusion relationship ($\beta = 0.149$). The strongest descriptive outcome occurs among high-use-high-literacy respondents, whereas high use combined with low literacy produces substantially weaker inclusion outcomes. These findings provide empirical support for the Islamic fintech inclusion paradox and for the role of Sharia compliance literacy as a capability-conversion factor.

5.2 Theoretical and Practical Implications

Theoretically, the study integrates technology use, capability conversion, Islamic financial knowledge, and substantive inclusion. It positions user capability not merely as an antecedent of adoption but as a potential condition shaping the developmental value of actual use. Practically, the framework supports literacy-by-design, transparent contract communication, Sharia assurance, suitability safeguards, and outcome-based monitoring. Providers should treat comprehension as part of product quality and governance rather than as an external education issue. Regulators can complement reach indicators with measures of responsible use, resilience, complaints, suitability, and welfare, while educational institutions can strengthen applied Sharia digital-finance literacy for Generation Z. A comparative Islamic-versus-conventional fintech design would be especially useful for testing whether Sharia compliance literacy adds explanatory value beyond general financial and digital literacy.

5.3 Limitations

The study has several limitations. First, the cross-sectional design captures contemporaneous associations and cannot establish temporal ordering or causal effects. Reverse causality remains possible: users who already experience better financial outcomes may become more active fintech users or acquire greater Sharia knowledge through repeated use. Longitudinal panel designs, field experiments that randomise embedded literacy interventions, and quasi-experimental designs exploiting platform or policy changes would strengthen causal inference. Second, self-reported usage and inclusion may be affected by recall, social desirability, and common method bias; future studies should combine survey responses with behavioural transaction records where feasible. Third, Islamic fintech is heterogeneous across payments, financing, investment, *takaful*, crowdfunding, and social finance, so product-specific risks and contracts may produce different moderation patterns. Fourth, the Generation Z and online purposive-sampling focus may limit generalisation to older cohorts and people with weaker internet access. Fifth, while the MFI construct demonstrates strong internal consistency, convergent validity, and discriminant validity in this sample, a separate multi-expert content-validity index was not available in the supplied data and should be added in future scale-development studies. Finally, comparative multi-group research involving Islamic and conventional fintech users is needed to determine whether Sharia compliance literacy offers incremental explanatory power beyond general financial and digital literacy.

References

- Alfarizi, M., & Ngatindriatun. (2022). Indonesian halal MSME open innovation with Islamic fintech adoption. *Jurnal Akuntansi dan Keuangan Indonesia*, 19(2), Article 5. <https://doi.org/10.21002/jaki.2022.11>
- Alshater, M. M., Saba, I., Supriani, I., & Rabbani, M. R. (2022). Fintech in Islamic finance literature: A review. *Heliyon*, 8(9), e10385. <https://doi.org/10.1016/j.heliyon.2022.e10385>
- Alsaghir, M. (2023). Digital risks and Islamic FinTech: A road map to social justice and financial inclusion. *Journal of Islamic Accounting and Business Research*, 16(7), 1265-1282. <https://doi.org/10.1108/JIABR-10-2022-0262>
- Askandar, N. S., Alrasyid, H., & Asri, N. W. (2026). Islamic fintech adoption and MSME financial inclusion in Indonesia. *Jurnal Ilmiah Akuntansi dan Bisnis*, 21(1), 40-57. <https://doi.org/10.24843/JIAB.2026.v21.i01.p03>
- Badan Pusat Statistik. (2021). Hasil Sensus Penduduk 2020. BPS-Statistics Indonesia.
- Bank Indonesia. (2025). Tinjauan Kebijakan Moneter Desember 2025. Bank Indonesia.
- Banna, H. (2025). Digital financial inclusion and bank stability in a dual banking system: Does financial literacy matter? *Journal of Islamic Monetary Economics and Finance*, 11(1), 63-90. <https://doi.org/10.21098/jimf.v11i1.2650>
- Demirgüç-Kunt, A., Klapper, L., Singer, D., & Ansar, S. (2022). The Global Findex Database 2021: Financial inclusion, digital payments, and resilience in the age of COVID-19. World Bank. <https://doi.org/10.1596/978-1-4648-1897-4>
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39-50. <https://doi.org/10.2307/3151312>
- Grohmann, A., Klühs, T., & Menkhoff, L. (2018). Does financial literacy improve financial inclusion? Cross country evidence. *World Development*, 111, 84-96. <https://doi.org/10.1016/j.worlddev.2018.06.020>
- Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2022). A primer on partial least squares structural equation modeling (PLS-SEM) (3rd ed.). Sage.
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43, 115-135. <https://doi.org/10.1007/s11747-014-0403-8>
- Hinkin, T. R. (1998). A brief tutorial on the development of measures for use in survey questionnaires. *Organizational Research Methods*, 1(1), 104-121. <https://doi.org/10.1177/109442819800100106>
- Kesuma, N. I., Sumiati, & Indrawati, N. K. (2025). Exploring how digital financial literacy affects fintech credit behavior through psychological and digital financial access. *Jurnal Dinamika Manajemen*, 16(2). <https://doi.org/10.15294/jdm.v16i2.27245>
- Mohamed, H. A., & Otake, T. (2025). The role of Islamic FinTech in digital financial inclusion and sustainable development post COVID-19: Cross-country analysis. *International Journal of Islamic and Middle Eastern Finance and Management*, 18(3), 649-671. <https://doi.org/10.1108/IMEFM-02-2024-0100>
- Muttaqien, M. K., Kartika, R. F., Sopa, & Idrus, A. (2025). The role of religiosity and financial literacy in the adoption of Islamic digital services in Indonesia. *Share: Jurnal Ekonomi dan Keuangan Islam*, 14(1), 447-471. <https://doi.org/10.22373/share.v14i1.26315>
- Otoritas Jasa Keuangan. (2024). Survei Nasional Literasi dan Inklusi Keuangan 2024. OJK.

- Ozili, P. K. (2018). Impact of digital finance on financial inclusion and stability. *Borsa Istanbul Review*, 18(4), 329-340. <https://doi.org/10.1016/j.bir.2017.12.003>
- Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879-903. <https://doi.org/10.1037/0021-9010.88.5.879>
- Polit, D. F., Beck, C. T., & Owen, S. V. (2007). Is the CVI an acceptable indicator of content validity? Appraisal and recommendations. *Research in Nursing & Health*, 30(4), 459-467. <https://doi.org/10.1002/nur.20199>
- Saputro, E. M., & Hati, S. R. H. (2021). The antecedents of Muslim customers' behavioral intention towards Islamic mobile payment. *Jurnal Ekonomi & Keuangan Islam*, 7(2), 123-138. <https://doi.org/10.20885/jeki.vol7.iss2.art2>
- Sen, A. (1999). *Development as freedom*. Oxford University Press.
- Trianto, B., Rahmayati, Yuliaty, T., & Sabiu, T. T. (2021). Determinant factor of Islamic financial inclusiveness at MSMEs: Evidence from Pekanbaru, Indonesia. *Jurnal Ekonomi & Keuangan Islam*, 7(2), 105-122. <https://doi.org/10.20885/jeki.vol7.iss2.art1>
- Venkatesh, V., Thong, J. Y. L., & Xu, X. (2012). Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Quarterly*, 36(1), 157-178. <https://doi.org/10.2307/41410412>

SUPPLEMENTARY APPENDIX A
PLS-SEM REPORTING OUTPUT BASED ON THE 410-CASE DATASET

Data-status note. The tables in this appendix report statistics recalculated from the 410-case item-level dataset supplied for the study. They cover indicator loadings, reliability and convergent validity, HTMT discriminant validity, bootstrapped structural paths, predictive assessment, and simple slopes. The values are analytical reporting outputs based on the supplied data and are not proprietary SmartPLS screenshots.

Table A1. Outer loadings

Indicator	Construct	Outer loading
AU1	AU	0.796
AU2	AU	0.821
AU3	AU	0.847
AU4	AU	0.824
AU5	AU	0.827
SCL1	SCL	0.764
SCL2	SCL	0.773
SCL3	SCL	0.795
SCL4	SCL	0.786
SCL5	SCL	0.819
SCL6	SCL	0.807
SCL7	SCL	0.800
SCL8	SCL	0.845
MFI1	MFI	0.793
MFI2	MFI	0.785
MFI3	MFI	0.787
MFI4	MFI	0.822
MFI5	MFI	0.811
MFI6	MFI	0.818
MFI7	MFI	0.825
MFI8	MFI	0.821

Table A2. Construct reliability and convergent validity

Construct	Cronbach α	Composite reliability	AVE
AU	0.881	0.913	0.677
SCL	0.919	0.934	0.638
MFI	0.924	0.938	0.653

Table A3. HTMT discriminant validity

Construct	AU	SCL	MFI
AU	1.000		
SCL	0.225	1.000	
MFI	0.599	0.487	1.000

Table A4. Bootstrapped structural-model results (5,000 resamples)

Path	β	Boot. SE	t	p	2.5% CI	97.5% CI	f ²	Decision
AU → MFI	0.468	0.039	12.102	<0.001	0.393	0.545	0.375	Supported
SCL → MFI	0.332	0.037	9.061	<0.001	0.261	0.405	0.186	Supported
AU × SCL → MFI	0.149	0.039	3.771	<0.001	0.077	0.232	0.039	Supported
Age → MFI	0.008	0.036	0.212	0.832	-0.063	0.077	<0.001	Not significant

Path	β	Boot. SE	t	p	2.5% CI	97.5% CI	f ²	Decision
Gender → MFI	0.006	0.076	0.079	0.937	-0.140	0.151	<0.001	Not significant
Education → MFI	0.031	0.040	0.763	0.445	-0.049	0.108	0.002	Not significant
Income → MFI	0.088	0.038	2.336	0.019	0.015	0.160	0.014	Significant
Residence → MFI	0.018	0.037	0.492	0.623	-0.056	0.089	0.001	Not significant

Table A5. Endogenous-construct and predictive assessment

Metric	Value
N valid	410
R ² (MFI)	0.442
Adjusted R ² (MFI)	0.430
Q ² _predict (10-fold)	0.423
RMSE (standardized MFI)	0.759
MAE (standardized MFI)	0.598

Table A6. Simple-slope analysis

Sharia compliance literacy	Effect of AU on MFI
Low (-1 SD)	0.319
Mean	0.468
High (+1 SD)	0.617

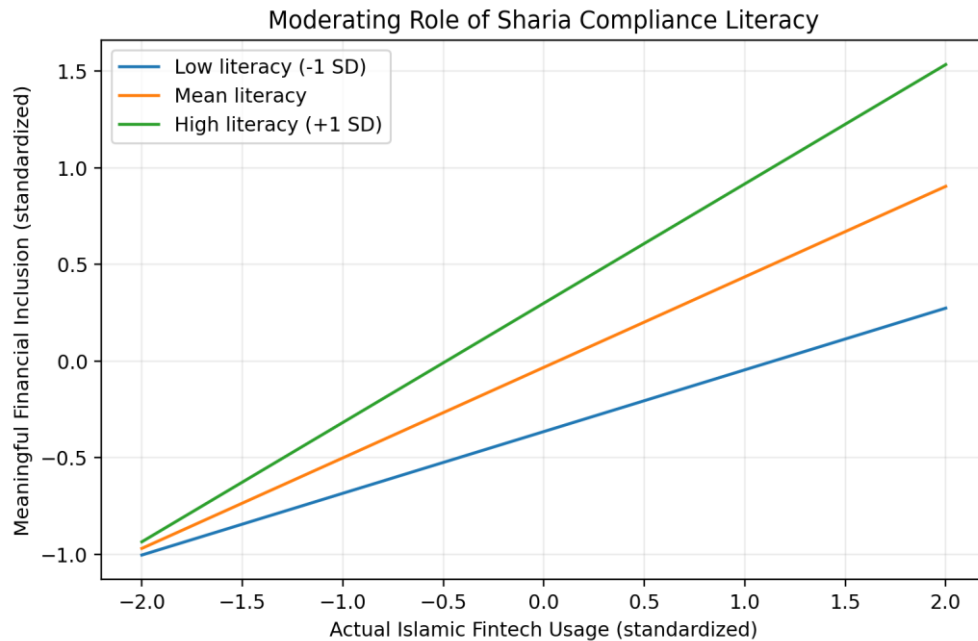


Figure A1. Moderation plot based on the 410-case analytical dataset

Analytical source file: Data mentah.csv, containing 410 records and 27 variables, including demographic controls, AU1-AU5, SCL1-SCL8, and MFI1-MFI8. The dataset can be used as the item-level input for independent software verification of the reported PLS-SEM model.