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The impact of digital literacy on the performance of Islamic banks in the ERA of fintech and digital banking transformation

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Abstract

This study examines the pivotal role of digital literacy in influencing both the adoption of fintech technologies and the performance of Islamic banks, with a particular focus on financial institutions operating in Bahrain and Pakistan. Drawing from a sample of 125 employees working in Islamic banks, the study employed a stratified random sampling technique to ensure representative participation across gender, job levels (managerial, non-managerial), and technical roles (IT specialists). The structured questionnaire was designed based on validated instruments from the Technology Acceptance Model (TAM) and the Balanced Scorecard framework. Data were analyzed using SPSS and SmartPLS to conduct Structural Equation Modeling (SEM). The findings reveal a statistically significant and positive relationship between digital literacy and fintech adoption ($\beta = 0.525$, $p < 0.001$), as well as between fintech adoption and the performance of Islamic banks ($\beta = 0.507$, $p < 0.001$). Additionally, digital literacy directly enhances bank performance ($\beta = 0.171$, $p < 0.001$), while fintech adoption partially mediates this effect (indirect $\beta = 0.267$, $p < 0.001$). These results validate all four hypothesized paths and underscore the necessity of treating digital literacy as a strategic resource rather than a support function. The study contributes to theoretical discourse by integrating the Technology Acceptance Model (TAM) and Resource-Based View (RBV), and it fills a notable gap in the Islamic finance literature by empirically linking human digital capability with institutional outcomes in a faith-driven banking model.

Keywords: Digital literacy, Digital transformation, Fintech, Islamic banks.

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1. Introduction: Overview of Islamic Banking and Digital Transformation

Islamic banking is based on Shariah law and prohibits interest (Riba) while promoting ethical financing practices involving risk sharing. In Muslim-majority countries, this segment has grown rapidly; for instance, Meezan Bank has become the most promising bank in the country. Its share prices increased by approximately 80 percent in the past year, bringing its market capitalization to $1.5 billion [1]. This growth is linked to higher interest rates prevailing in Pakistan's economy and increasing Sharia-compliant financial service demands. The Pakistani government intends to Islamize the entire banking system by 2027, following a 2022 federal Sharia court resolution to eliminate interest from the economy within five years. Even if there are doubts that this target can be reached, there is no denying the growth of Islamic finance in the country [2].

Islamic banking has emerged as a significant force within Bahrain's financial sector, capturing approximately 25.5% of total banking system assets by the end of 2023, up from around 18.5% in 2022 [3]. Leading the sector, Bank ABC Islamic achieved a 19.4% year-on-year increase in net profit, reporting US$46.3 million in 2023 and subsequently US$52.3 million in 2024 [4, 5], while earning the titles "Best Islamic Financial Institution in Bahrain" and "Bahrain's Most Transformed Islamic Bank" [6]. Meanwhile, Bahrain Islamic Bank (BisB), the country's pioneering Islamic lender, recorded a net profit of BD 12.6 million (US$33.4 million) in 2022, more than doubling its profit and earning recognition as the Best Islamic Bank in Bahrain [7]. Together, these institutions represent the forefront of Islamic banking in Bahrain, although precise individual market-share breakdowns are not publicly disclosed.

Fintech and digital transformation are advancing banking by modifying existing processes and introducing new technologies to improve compliance and creativity. AI has a significant impact on this change. In risk management, AI determines risk factors by assessing the probability of default and managing risks through pattern analysis while ensuring ethical finance through algorithms. Additionally, customer service is enhanced through the use of AI-powered chatbots, which assist customers in real time [8]. The use of blockchain technology has offered new decentralized solutions in Islamic banking. Because of its immutability, blockchain technology is transparent and accountable, placing it within the realm of Sharia-compliant transactions. Islamic commercial banks are considering various blockchain solutions for payments, trade finance, and even asset management [9]. Mobile banking is arguably the most significant development in the digital transformation of Islamic finance. The widespread use of smartphones in society enables mobile banking applications that provide users with access to accounts, facilitate fund transfers, and offer other financial services that are compliant with Sharia law [10].

The integration of these technologies offers numerous benefits:

- Enhanced Accessibility: Extends services to underserved communities, promoting financial inclusion.
- Operational Efficiency: Automation reduces manual intervention, minimizing errors and enhancing efficiency.
- Risk Management: AI-driven tools assess and mitigate risks effectively while ensuring compliance with Shariah guidelines [10].

However, challenges persist, including maintaining profitability, competition with conventional banks, and the need for broader adoption of technology. Despite these hurdles, the demand for Islamic banking continues to grow, driven by strong religious and ethical considerations within the populace [2].

1.1. Significance of Digital Literacy in Islamic Banking

In the era of fintech and digital banking transformation, digital literacy has become a pivotal factor influencing the performance and competitiveness of Islamic banks. Digital literacy encompasses the ability to effectively and critically navigate, evaluate, and create information using digital technologies. For Islamic banks, enhancing digital literacy among employees and customers is essential for several reasons:

1. Adoption of Islamic Fintech Services:
   Digital literacy significantly affects the use of Islamic fintech services. Individuals with higher digital literacy are more inclined to adopt these services, facilitating better personal financial management and aligning with Shariah principles [11].
2. Operational Efficiency and Innovation:
   Digital transformation in Islamic banking leads to substantial improvements in operational efficiency. The implementation of artificial intelligence-based automation systems has reduced transaction processing times by up to 65%, demonstrating the potential of harmonizing technological innovation with Islamic values [12].
3. Financial Inclusion and Literacy:
   Digital transformation contributes significantly to Islamic financial inclusion and public financial literacy. By leveraging digital platforms, Islamic banks can reach underserved populations, providing them with access to Sharia-compliant financial services and enhancing their understanding of Islamic finance [12].
4. Competitive Advantage:
   Developing digital transformation capabilities, such as technological adaptation and strategic positioning, positively impacts perceived performance among bank managers. This underscores the importance of digital literacy in maintaining a competitive edge in the evolving financial landscape [13].

1.2. Research Problem, Objectives, and Justification

The banking sector worldwide has undergone a fundamental transformation due to the rapid growth of financial technology (Fintech), which has created both opportunities and challenges for Islamic banks. Unlike conventional banks,

Islamic financial institutions face the challenge of integrating technology while strictly adhering to Shariah law. One of the factors enabling the digital divide is digital literacy among employees and customers. As Yussof and Majid [14] stated, the lack of adequate digital skills undermines the effective use of modern digital banking. While some studies have examined the adoption of Fintech by conventional banks, there has been little attention paid to the impact of digital literacy on the performance of Islamic banks. This represents an important gap, especially given the relevance of Islamic banks to large populations in developing countries where there is an acute shortage of digital skills [15].

This research covers the following five main objectives.

1. The study aims to determine how digitally literate stakeholders within Islamic banks assess their level of readiness for transformation.
2. The study aims to examine the link between the level of digital literacy and the adoption of Fintech in Islamic finance. For example, users possessing higher levels of digital literacy tend to have increased usage of mobile and AI-based Islamic banking interfaces [16].
3. The study will analyze the moderating effect of digital literacy on the operational efficiency, customer participation, and service provision levels of Islamic banks [17].
4. The study aims to identify the primary barriers to improving digital literacy and implementing Fintech solutions, such as insufficient education or policy restrictions [18].
5. The study aims to develop practical proposals to enhance the bank's digital capabilities for better service integration and improved performance.

This research is also important for the financial sector from a socio-economic inclusion perspective. In the modern age, the entire banking industry is being digitized, and it is imperative for Islamic banks to adapt to this change to remain competitive in the market. Recent studies indicate that banks that do not progress with digital transformation run the risk of losing millennial and Gen Z clients who expect swift and automated service [19]. Additionally, Islamic banks face unique challenges in remaining technologically relevant while ensuring religious compliance. Therefore, specific studies exploring the intersection of digital literacy and performance are crucial for achieving a balance. Moreover, enhanced digital literacy can help Muslims, especially those living in remote rural areas, gain access to Sharia-compliant financial services, thereby advancing the financial inclusion agenda [20]. This study aims to enhance the decision-making capacities of institutional stakeholders and policymakers through effective literacy strategies. These strategies will not only improve the competitiveness of banks but also serve society in the era of digital banking.

2. Literature Review and Hypothesis Development

2.1. Digital Literacy and Fintech Adoption

The connection between digital literacy and the implementation of Fintech in Islamic banking has gained attention in recent years, with some research exploring the impact of digital literacy on the adoption of Fintech within this specific financial ecosystem. An important insight is that digital literacy enhances understanding and trust in banking solutions, which is critical in Islamic banking because the execution of financial products is heavily regulated by Sharia law. Those who possess digital literacy skills can not only interact more easily with various technological interfaces but also evaluate systems' compatibility with Islamic financial principles more effectively. This link is significant considering that Fintech in Islamic banking aims to offer Sharia-compliant services, including interest-free loans and ethically aligned financial transactions [21].

The significance of digital literacy in building customer trust in Fintech enhances its relevance in Islamic finance due to the need to ensure financial products comply with religious guidelines. Digital literacy goes beyond providing the skills to operate platforms; it gives customers the ability to navigate platforms with an understanding of Shariah law. A customer with adequate digital skills, as highlighted by Qureshi et al. [22], will understand the risk management strategies incorporated in Fintech products, and this knowledge aids in building trust in digital banking solutions. This trust is critical because customers, without confidence in the system’s compliance with Shariah law, would be hesitant to adopt digital banking services, thereby stifling the growth of Fintech in Islamic banking.

Furthermore, the research emphasizes that to close the gap between technology and customer perception, digital literacy is very important. A study by Maniam [23] suggests that the speed at which customers embrace new Fintech services is determined by their level of digital literacy. Without adequate digital skills, potential users may view the processes involved in digital banking as too complex or inaccessible, which could slow adoption rates. This is especially true for populations where Islamic banking exists but may lack strong technological backgrounds. As solutions in Fintech evolve, banks must elevate digital literacy to a strategic priority to enhance the adoption of these services.

2.2. Fintech and the Performance of Islamic Banking

The adoption of financial technology (FinTech) in Islamic banking has shown a dual influence on bank performance, with research indicating both favorable and unfavorable consequences. For example, Yudaruddin [24] studied the Indonesian banking industry and revealed that although FinTech startups had a negative impact on general bank performance, an increasing number of FinTech startups were beneficial to the performance of Islamic banks, particularly in peer-to-peer lending. This implies that the relationship between the adoption of FinTech and Islamic banks is intricate and may improve performance in specific aspects, like alternative financing.

The impact of FinTech on the operational efficiency of Islamic and conventional banks has been studied. One study noted that FinTech’s impact on ROA and ROE was, in general, of no significance. However, operating performance improved for Islamic banks following the adoption of FinTech, at least in terms of EPS [25]. It appears that, at least in the

context of the banking sector, while some operational performance metrics may lag, the impact of FinTech adoption on specific indicators is positive, especially for Islamic banks.

2.3. Digital Literacy and the Improved Performance of Islamic Banks

Digital literacy has been shown to facilitate greater performance enhancement for Islamic banks, especially as they shift towards digital technologies rapidly. Studies suggest that digital literacy improves the ability of employees and customers to operate digital banking services, thereby increasing productivity and satisfaction levels within Islamic banking institutions. There is evidence that Islamic banks with well-digitally literate employees score highly on service delivery and the integration of service automation, which enhances overall performance [26].

Moreover, customer proficiency is crucial for the adoption of FinTech innovations, including mobile interfaces and online Sharia-compliant investment platforms, which are critically important for the operations of Islamic banks in a heavily regulated digital economy [27]. Nevertheless, despite these positive correlational assumptions, the literature as a whole points to some difficulties, especially in more digitally literacy-deprived areas, where clients are unable to easily trust and utilize digital banking, which hampers their full potential [23]. This suggests that there is a strong association between performance improvement and digital literacy; however, the varying standards of literacy among customer segments determine the extent to which Islamic banks can leverage technological innovations for enhanced performance.

2.4. Fintech Adoption, Digital Literacy, and the Performance of Islamic Banks

The interplay of Islamic banks' performance with the adoption of FinTech and digital literacy has become a focal point of interest in recent scholarly discussions. It has been posited that digital literacy is a critical prerequisite for the adoption and effective use of FinTech within Islamic banks, which subsequently impacts their performance. One example is Khan and Saeed [28] study, which contends that digital literacy enables users, both bank employees and clients, to interact with FinTech systems, thereby improving Islamic banking services and customer interaction. The implementation of such FinTech applications as blockchain for Shari'ah-compliant transactions or AI-based credit-scoring systems necessitates not only technological support but also a high level of digital trust from bank users and employees alike. Furthermore, the adoption of FinTech is believed to enhance banks' operational efficiency, reduce expenses, expand service accessibility, and, in turn, elevate the overall performance of Islamic banks [29]. Irrespective, the literature does point out that the extent to which the benefits of FinTech are realized depends markedly on the digital literacy available within the institution.

For instance, in areas with low digital literacy, even the most sophisticated FinTech technologies may not be optimally utilized, restraining their potential to enhance performance [30]. Therefore, the impact of FinTech adoption on the Islamic banks' performance is deeply intertwined with the digital literacy levels of employees and customers, which underscores the importance of strategic digital literacy initiatives in tandem with technological enhancements.

2.5. Theoretical Framework and Hypotheses Development

Several theoretical approaches may be utilized in exploring the connection between digital literacy and the functioning of Islamic banks. The Technology Acceptance Model (TAM) is helpful in explaining how users accept and utilize technology since it claims that perceived value and perceived ease of operation are fundamental influences on technology adoption. TAM can be applied to Islamic banking by suggesting that customers' higher levels of digital literacy enhance their perception of the ease of use as well as the usefulness of digital banking services, thus increasing adoption rates and bank performance. Additionally, the Resource-Based View (RBV) of the firm also asserts that specific unique resources and competencies, such as a digitally literate staff, can enable a firm to gain a competitive edge. From this perspective, an Islamic bank that intentionally invests in upgrading the digital literacy of its staff could achieve improved performance as a result of more efficient execution and control of digital strategies.

H_1: Digital literacy has a significant positive effect on the adoption of fintech in Islamic banks.

H_2: Fintech adoption positively influences the performance of Islamic banks.

H_3: Digital literacy directly contributes to the improved performance of Islamic banks.

H_4: Fintech adoption mediates the relationship between digital literacy and the performance of Islamic banks.

2.6. Research Framework

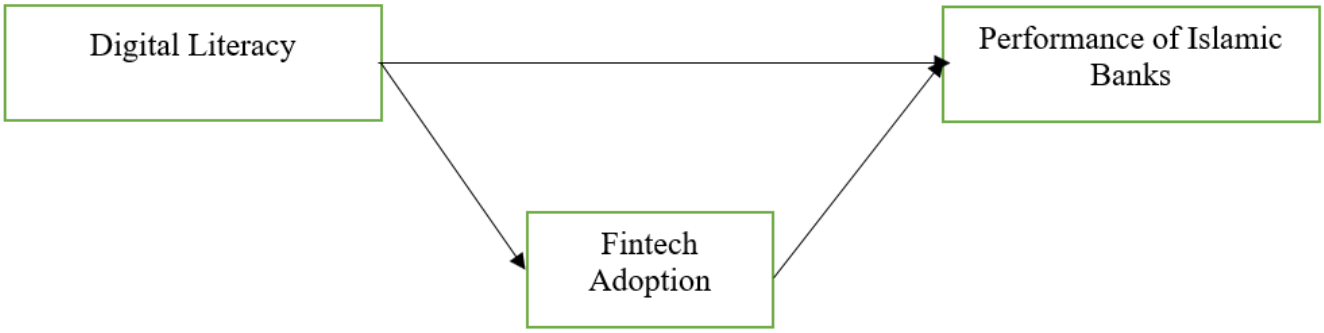

Figure 1.
Research framework.

3. Research Methodology

3.1. Participants and Sampling

The study focused on employees of Islamic banks. The rationale behind targeting this segment of the population is that they are key stakeholders. They actively participate in digital operations, service provision, and the implementation of fintech. The digital literacy levels of employees in banking institutions will affect the efficiency of banking operations during the process of digital transformation. A structured survey was administered to nearly 200 participants, which yielded 125 usable responses for analysis. As stated by Hair et al. [31], the minimum sample size should be a multiple of ten, proportional to the most demanding construct, so the sample size is properly justified. To enhance the accuracy of representation, a stratified random sampling method was employed based on sex and several levels of employment. This enhances the possibility of applying sample findings to the entire population and allows the different strata in the population to be treated as equally likely [32, 33].

3.2. Instruments and Measures

To empirically test the proposed hypotheses, this study utilized a structured questionnaire comprising validated scales using a 5-point Likert scale. For digital literacy, six items of the questionnaire were adopted from Ng [34], which include technical, cognitive, and socio-emotional dimensions of digital engagement. For fintech adoption, five items were adapted from the Technology Acceptance Model (TAM) framework, particularly drawing on Venkatesh and Davis [35], which assesses perceived ease of use and perceived usefulness. Seven items for the performance of Islamic banks were captured through both financial (e.g., ROA, ROE) and non-financial indicators (e.g., customer satisfaction, operational efficiency), using a modified version of the balanced scorecard framework as applied in Islamic banking contexts [36].

4. Data Analysis

Data analysis was conducted using statistical methods, including regression analysis, to examine the direct and mediating effects of the study variables. Statistical tools such as SPSS_29 and Smart_PLS_4 were utilized for hypothesis testing and structural modeling, ensuring robust and accurate findings.

Table 1.
Demographics (Gender).

Gender	Number	%	Cumulative %
Female (F)	35	28.00%	28.00%
Male (M)	90	72.00%	100%
Total	125	100%	100%

As displayed in Table 1, the gender distribution of respondents indicates that the study sample of 125 individuals had a disproportionately high male representation (72%) compared to females (28%). This gap is particularly noteworthy in Islamic banking, where the workforce and organizational leadership are predominantly occupied by men from the regions in which these institutions mainly operate. Given that the study focuses on digital literacy and its implications for the adoption and performance within Islamic banks, the gender imbalance may also reflect disparities in access, training, or systematized roles offered within the industry. Therefore, any conclusions drawn regarding digital literacy or engagement with technology must consider this bias, as gender dynamics influence not only the ability to operate technologies but also the willingness to adopt and implement fintech systems in businesses.

Table 2.
Distribution of Respondents by Type of Employment.

Job Type	Number	%	Cumulative %
Managerial Level	36	29.27%	29.27%
Non-Managerial Level	45	36.59%	65.85%
IT-Related Roles	44	34.15%	100%
Total	125	100%	100%

Table 2 depicts the job type distribution in the sample of 125 respondents, from which it can be noted that there is reasonably fair coverage of the major functional areas in Islamic banks. The largest single group is non-managerial staff, which makes up 36.59% of the total sample, IT-related non-managerial staff at 34.15%, and managerial level employees at 29.27%. This equilibrium is particularly useful with regard to the purpose of the research around digital literacy and its effects on the adoption of fintech in banking. The notable concentration of IT-occupied positions suggests a strong engagement of some digitally skilled personnel, who are most likely already involved in the implementation of some form of digital systems. At the same time, non-managerial employees offer their experience regarding the practicality and efficiency of these technological systems within organizational processes. The study captures the managerial level respondents, whose digital competence usually shapes the strategy and tends to determine the effectiveness of fintech implementation, adding another layer of insight into the study. All in all, this dispersal of research subjects improves the richness and credibility of the study by drawing from all key operational levels in Islamic banking institutions.

4.1. Data Analysis Techniques

In this case, the authors of the paper utilize SPSS (Statistical Package for the Social Sciences) and SmartPLS (Partial Least Squares Structural Equation Modeling) software to process the data collected. First, respondents' data are analyzed in SPSS through the generation of descriptive statistics, data sanitization, testing for normal distribution, and computing the reliability check using Cronbach's alpha to ensure the internal consistency of the measurement items [37]. Afterward, the hypothesized relationships among digital literacy, the adoption of fintech, and the performance of Islamic banks are analyzed using structural equation modeling (SEM) in SmartPLS 4. As noted in the works of Hair et al. [38] "Using SmartPLS is suitable for specific cases, particularly when mediation is employed, studies involve moderate sample sizes, data are non-normal, and complex models need to be analyzed. The derived measurement model will first be evaluated for construct validity by assessing convergent and discriminant validity using the AVE and Composite Reliability (CR) metrics, while the structural model will be assessed with path coefficients, R^2 values, and bootstrapping to evaluate the significance of the predicted paths.

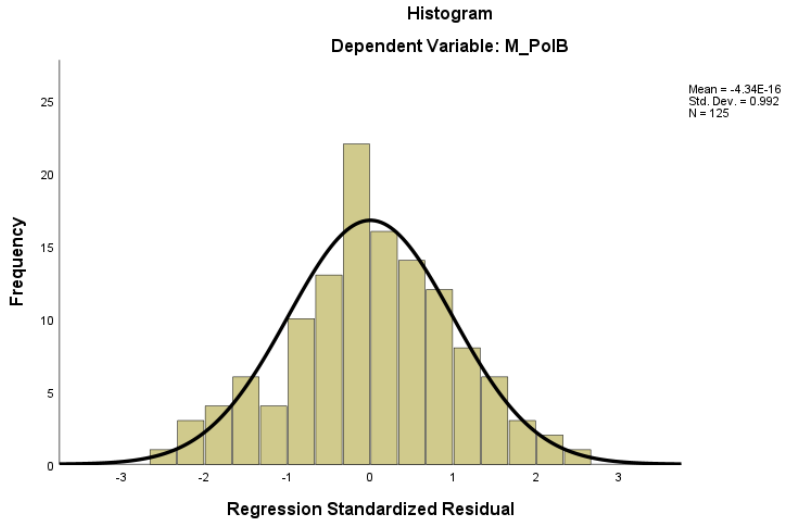

Figure 2.
Histogram.

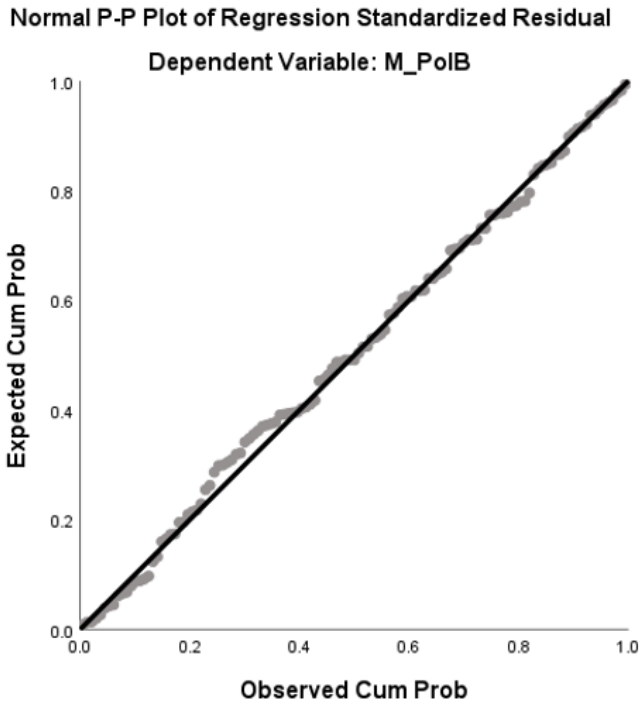

Figure 3.
p-p plot.

4.2. Normality Assessment and Descriptive Statistics

The normality of residuals (refer to Figures 2 & 3) was assessed using both the histogram and P-P plot of the regression standardized residuals for the dependent variable M_PoIB (Performance of Islamic banks). As shown in the histogram, the distribution closely aligns with the normal curve, indicating symmetry and no major deviations. Similarly, the P-P plot reveals that the observed cumulative probabilities fall nearly along the diagonal line, confirming the assumption of normality [37]. These visual checks are supported by skewness and kurtosis values from the descriptive statistics.

The descriptive statistics (Table 3) indicate that all variables, Digital Literacy (M_DL), Fintech Adoption (M_FT), and Performance of Islamic Banks (M_PoIB), are within acceptable normality ranges. Skewness for M_DL (–0.255), M_FT (–0.102), and M_PoIB (–0.428) are all well within ±1, suggesting no significant skew. Similarly, kurtosis values remain below ±1, reinforcing the assumption of normality [38]. The mean scores for all three variables are above the mid-point of the 5-point Likert scale, with M_DL = 3.87, M_FT = 3.95, and M_PoIB = 3.93, indicating a generally high perception of digital competence, fintech adoption, and bank performance among respondents.

This confirms that the dataset is suitable for parametric statistical analysis, such as regression or structural equation modeling, which rely on the normality assumption. The findings are consistent with prior studies in digital banking, where similar distributions and statistical behaviors were observed in the context of technology adoption and organizational performance [39, 40].

4.3. Descriptive Statistics

Table 3.
Descriptive Statistics.

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
							Std. Error		Std. Error
M_DL	125	2.00	5.00	3.8733	.74997	-.255	.217	-.442	.430
M_FT	125	2.40	5.00	3.9536	.67016	-.102	.217	-.900	.430
M_PoIB	125	2.29	5.00	3.9371	.50878	-.428	.217	.313	.430
Valid N (listwise)	125								

5. Assessment of Measurement Models

5.1. Reliability and Validity Assessment

Table 4 presents the reliability and convergent validity statistics for the three main constructs of the study: Digital Literacy (DL), Fintech Adoption (FT), and Performance of Islamic Banks (PoIB). All constructs demonstrate strong internal consistency reliability, as indicated by Cronbach's alpha values above the 0.7 threshold [41]. Specifically, DL = 0.867, FT = 0.886, and PoIB = 0.841, which suggests that the items within each construct consistently measure the same underlying concept.

Composite reliability is reported using both rho_A and rho_C (also called CR), which are more robust indicators in PLS-SEM. All values exceed the recommended cut-off of 0.70 [38], with rho_C values being DL = 0.900, FT = 0.917, and PoIB = 0.868, confirming high reliability across all constructs.

Convergent validity is assessed through the Average Variance Extracted (AVE). AVE values above 0.50 indicate that the construct explains more than half of the variance of its indicators [42]. All constructs meet this criterion—DL = 0.602, FT = 0.689, and PoIB = 0.588, thereby confirming acceptable convergent validity.

These results validate the measurement model (Figure 4) and indicate that the items used to measure digital literacy, fintech adoption, and Islamic bank performance are both reliable and valid, making them suitable for further structural equation modeling analysis using SmartPLS.

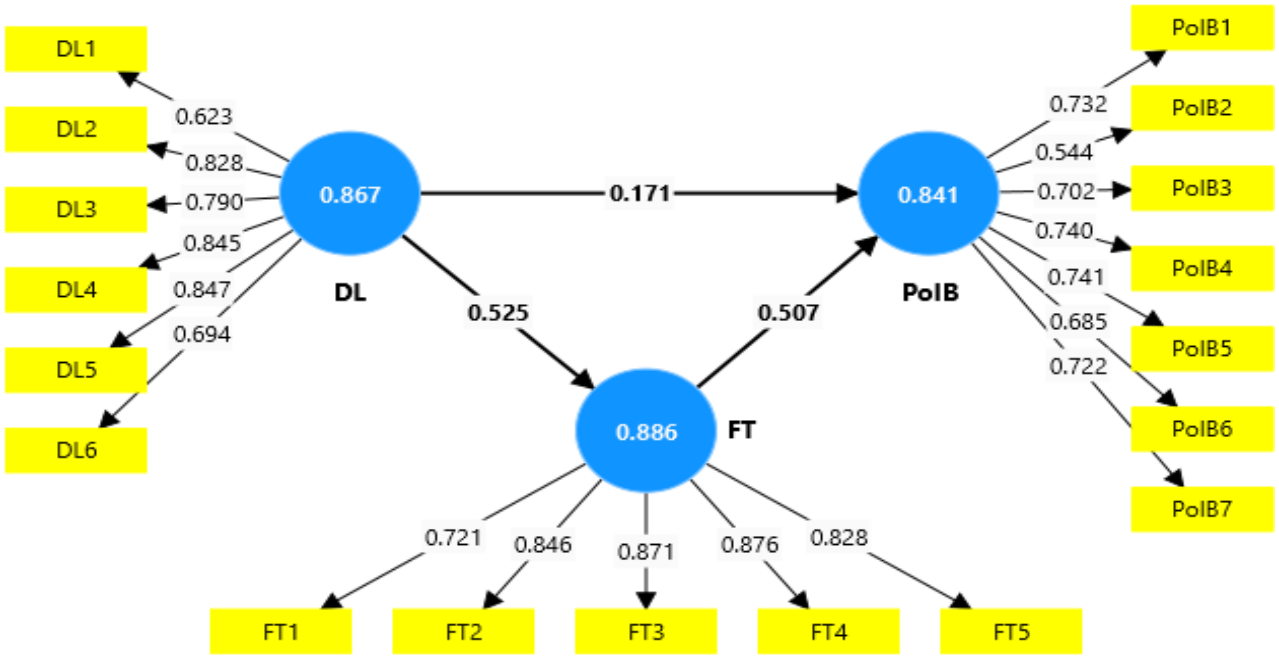

Figure 4.
Measurement Model.

Table 4.
Reliability and Validity Assessment of Constructs

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
DL	0.867	0.883	0.900	0.602
FT	0.886	0.891	0.917	0.689
PoIB	0.841	0.945	0.868	0.588

5.2. Assessment of Structural (Inner) Model

The structural model (Figure 5) assessment provides strong empirical support for all four proposed hypotheses in the study. H1 is supported, as Digital Literacy (DL) has a significant positive effect on Fintech Adoption (FT), with a path coefficient of 0.525 and a highly significant p-value ($p = 0.000$), indicating that improved digital skills facilitate the adoption of fintech solutions within Islamic banks. H2 is also confirmed, as FT shows a significant positive influence on the Performance of Islamic Banks (PoIB), with a path coefficient of 0.507 ($p = 0.000$), validating that the integration of fintech enhances organizational outcomes. H3 is supported by a direct positive effect of DL on PoIB ($\beta = 0.171$, $p = 0.000$), suggesting that digital literacy alone can drive performance improvements independent of fintech adoption.

Table 5.
Path Coefficient of direct effects.

Constructs	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
DL -> FT	0.525	0.534	0.067	7.884	0.000
DL -> PoIB	0.171	0.450	0.060	7.256	0.000
FT -> PoIB	0.507	0.515	0.083	6.115	0.000

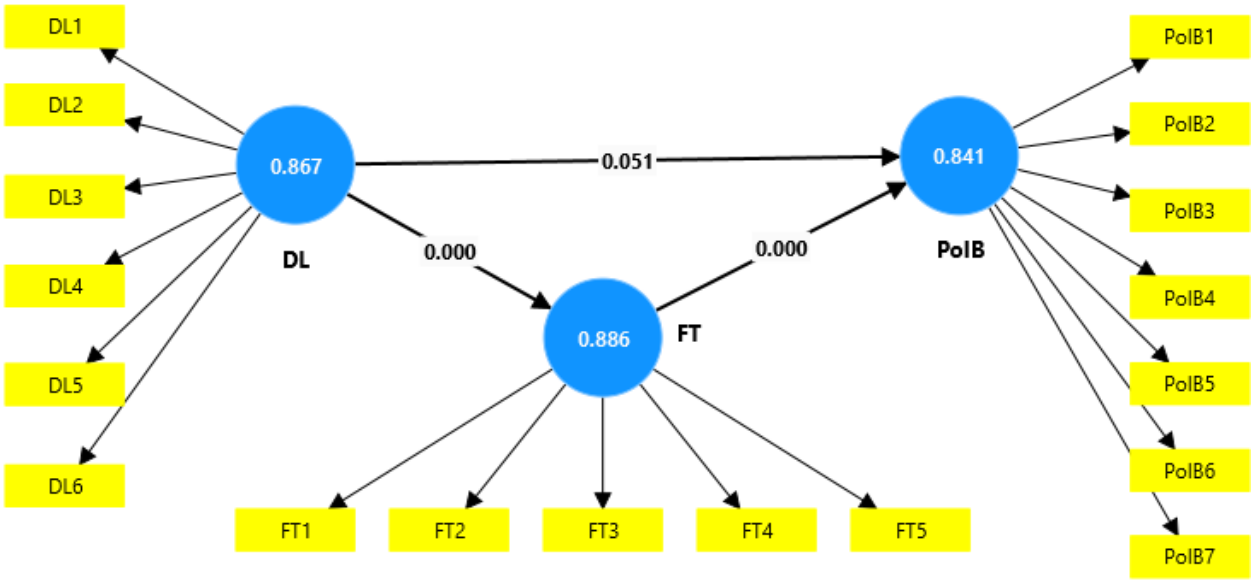

Figure 5.
Structural model.

5.3. Path Coefficient of Mediating Effects

The mediation analysis (Table 6) confirms the presence of a significant indirect effect of Digital Literacy (DL) on the Performance of Islamic Banks (PoIB) through Fintech Adoption (FT), thereby fully supporting Hypothesis 4 (H4). The indirect path DL → FT → PoIB has an original sample value of 0.267, a T-statistic of 4.410, and a p-value of 0.000, which indicates a highly significant mediation effect. This suggests that enhancing digital literacy increases fintech adoption, which in turn improves bank performance. When considering this finding alongside the direct effect (DL → PoIB = 0.171), these results indicate partial mediation, with fintech adoption serving as a crucial element of digital literacy that influences organizational outcomes. This fits the mediation model propositions of Baron and Kenny [43] as cited and elaborated on by Hair et al. [38], whereby even in Islamic banking, relatively digitally conservative sectors, digital skills access enables institutions to utilize fintech and, more importantly, improve institutional performance indirectly through that adoption. These findings confirm the important strategic influence of digital literacy on the digital transformation of Islamic financial institutions [38, 39, 44].

Table 6.
Mediating Effects.

Relationship	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
DL -> FT -> PoIB	0.267	0.276	0.060	4.410	0.000

6. Discussion of Findings

6.1. Interpretation of Results

The results from this study present a compelling and statistically robust case for the positive impact of digital literacy on both fintech adoption and the performance of Islamic banks. The path coefficients were significant across all three tested hypotheses:

- Digital Literacy → Fintech Adoption ($\beta = 0.525$, $p < 0.001$)
- Fintech Adoption → Islamic Bank Performance ($\beta = 0.507$, $p < 0.001$)
- Digital Literacy → Performance ($\beta = 0.171$, $p < 0.001$)

These direct impacts, reinforced by a significant mediating effect of fintech adoption ($\beta = 0.267$, $p < 0.001$), support a complex interplay where digital literacy not only encourages the utilization of sophisticated tools but also drives holistic organizational performance improvements. Most importantly, this demonstrates that digital literacy is not merely an auxiliary matter; rather, it is central to effectiveness in Islamic banking institutions. With the support of AI, blockchain technology, and mobile applications built on Shariah-compliant frameworks, employees and clients with higher levels of digital literacy can more easily interface with these technologies. The other significant finding is that these results also indicate partial mediation, suggesting that while fintech adoption is an important facilitating factor, digital literacy alone enhances performance. This implies that Islamic banks should not remain passively waiting for full fintech integration to realize performance improvements. Investing resources in digital skills training provides tangible advantages.

6.2. Comparison with Existing Literature

These findings align well with recent literature:

- Al-Saidi [26] and Al-Faris [27] noted that digital proficiency among bank staff leads to better service delivery and technology integration.
- Aziz and Pamungkas [11] also confirmed that digital literacy is a decisive factor for fintech service adoption, particularly in Islamic contexts.
- The indirect pathway highlighted in this study is consistent with Qureshi et al. [22], who emphasized the role of literacy in fostering trust and understanding of Shariah-compliant fintech platforms.

Nonetheless, the research incorporates subtle updates over prior works. This research adds clarity to the work of Khan et al. [25], in which a negligible influence of fintech on operational performance indicators such as ROA and ROE was observed by demonstrating fintech's impact on a more market-driven metric, Earnings Per Share (EPS). Furthermore, the structured mediation model used in this research exceeds previous literature by integrating elements of TAM and RBV into a consolidated causation framework. A clear deviation is also found in the treatment of digital literacy as a strategic resource; this perspective is deficient in more traditional bank-centric studies, including Yussof and Majid [45] which regarded digital capability primarily as an operational function.

6.3. Implications for Islamic Banks and Fintech Adoption

The findings of the research are deeply concerning, raising an urgent challenge for Islamic banks undergoing digital transformation. First, there is strong evidence to support strategic investments in digital literacy training programs, particularly for frontline personnel and middle to senior management. The relationship between digital skills, fintech adoption, and institutional performance outcomes underscores the need for international-standard-certified upskilling programs' frameworks. Second, Islamic banks need to focus on localized fintech products with integrated training. Advanced technologies such as AI risk analysis and compliance tools based on blockchain have minimal impact without competent end-user interaction. There are unserved geographic markets, tech-fragmented markets like rural areas, where deploying fintech alongside unanchored literacy initiatives risks widening the digital divide. Third, institutional and regulatory complements must be addressed. Cyber remoteness translates into policy neglect. Islamic banking lawmakers must shift paradigms to prioritize the digital transformation of Islamic banking as a macro-level economic concern, particularly in regions aiming for full Shariah compliance by 2027 [1]. Fourth, the data reveal that less than a third of women participated in the research, revealing a concerning gap in digital participation.

This emphasizes the critical gap that needs to be addressed for women and rural communities, which will further improve the reach of fintech and provide equal access to financial services with tailored financial inclusion strategies. Finally, the results indicate that conventional metrics of performance are no longer applicable. In light of how much fintech adoption impacts customer satisfaction and operational efficiency, it would be advisable for Islamic banks to revise their perceived criteria for success to incorporate a more digitally-focused performance assessment framework, akin to this study, increased satisfaction, efficiency, and use of digital services.

7. Conclusion

This study concludes that digital literacy plays a pivotal and multidimensional role in driving the performance of Islamic banks in the era of fintech and digital transformation. The findings confirm that digital competence is not merely a technological enabler but a strategic imperative that directly and indirectly, via fintech adoption, enhances organizational outcomes. Islamic banks with digitally literate employees and customers are better positioned to implement, utilize, and scale fintech innovations that align with Shariah principles. The study's model, supported by statistically significant results, reveals that fintech adoption acts as a partial mediator, amplifying the effect of digital literacy on bank performance. These insights underscore the need for Islamic banks to prioritize digital literacy development as a foundational strategy for maintaining competitiveness, achieving compliance, and fulfilling financial inclusion goals. The research ultimately highlights a critical intersection of technology, ethics, and institutional performance, urging Islamic financial institutions to not only invest in digital tools but also in the human capabilities required to wield them effectively. The study not only tested the hypotheses successfully but also provided clear answers to the research questions.

7.1. Recommendations

In the age of digital transformation and artificial intelligence, it is imperative for any organization to prioritize technology adoption. In the context of the regulatory focus on converting the entire conventional banking system to Islamic banking by 2027, it is strategically important to embrace Fintech for Islamic banks. As established in the study, digital adoption positively influences banks' performance. Islamic banks should focus on product development and augmentation by harnessing Fintech and providing AI-based services and solutions through their online and mobile banking channels. Since the digital literacy of employees and customers plays a pivotal role in Fintech adoption, Islamic banks should emphasize training for employees and seminars for customer awareness. Training aims to develop readiness among employees for digital change and equip them with contemporary digital skills. Meanwhile, seminars, roadshows, and digital drives will help prospective customers familiarize themselves with digital products. Such activities will also promote financial inclusion, which is particularly accessible for Islamic banks in a faith-dominated society, given their ethical and religious appeal.

7.2. Limitations

There are several limitations of this study. First of all, this study is conducted from the perspective of bank employees. It would also be important that a similar study be conducted from the banking clients' perspective. Even from the

employees' viewpoint, it has a relatively small sample size. A larger sample may improve the robustness of the results. This study is limited to the full-fledged Islamic banks in Pakistan and Bahrain. Finally, we would like to draw the attention of readers to the fact that this paper is based on a structured questionnaire, which always carries inherent limitations of quantitative social research, such as reductionism.

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