JIFTECH : Journal Of Islamic Financial Technology
Vol. 4 (2), Desember : 73 - 89

DIGITAL FINANCIAL TRANSFORMATION AND EFFICIENCY IN ISLAMIC BANKING SYSTEMS

Nofinawati[1], Adanan Murroh Nasution[2]
nofinawati@uinsyahada.ac.id[1], adananmurroh@uinsyahada.ac.id[2]

UIN Syekh Ali Hasan Ahmad Addary Padangsidimpuan[1,2]

ABSTRACT

This article aims to systematically examine the relationship between digital financial transformation and efficiency in the Islamic banking system. The study focuses on how the adoption of digital technologies influences operational performance, sharia compliance, and the expansion of financial inclusion. Using a systematic literature review based on an interpretive-constructivist paradigm, this study analyzes empirical and conceptual research from various cross-country contexts. The review covers digitalization trends, sharia governance models, and efficiency indicators such as cost-to-income ratio, transaction speed, customer assessment accuracy, profitability, and financial stability. The findings indicate that digital transformation generally enhances the efficiency of Islamic banks by reducing operational costs, improving service quality, accelerating transactions, and expanding access to financial services for underserved groups. However, several challenges remain, including digital infrastructure limitations, cybersecurity risks, human resource constraints, and the complexity of aligning digital innovation with sharia principles. This study contributes by proposing an integrated conceptual framework that explains how digitalization affects both operational efficiency and sharia compliance in Islamic banking. The findings highlight the importance of strengthening digital governance, enhancing digital skills, harmonizing regulations, and modernizing sharia supervision to ensure that digital transformation is safe, inclusive, and sustainable.

Keywords: Digital Financial Transformation, Efficiency, Islamic Banking Systems

INTRODUCTION

Digital transformation is now an inevitable phenomenon in the global Islamic banking industry, characterized by increasing efficiency needs, increasingly high service expectations, and increasingly fierce competition with conventional banks that have adopted advanced digital technology first. A number of studies show that the use of digital technology is able to reduce operational costs and increase the competitiveness of Islamic banks, as evidenced by the findings of Al Khassawneh, (2024) on Islamic banks in Jordan. In addition, a cross-border study by Al-Haija et al., (2025) confirms that Digital Banking Transformation (DBT) contributes significantly to increasing profitability, efficiency, customer satisfaction, and market competitiveness. The phenomenon of accelerating digitalization is also triggered by the strategic needs

of the industry, where Adewale & Ismal, (2022) found that digital modernization is an important effort to improve operational efficiency and competitiveness, although it is still hampered by limited infrastructure and human resources. In Indonesia, digitalization is seen as a necessity to retain customers amid the rapid innovation of conventional banks, but it must still be in line with strict sharia principles (Ichsan et al., 2024). In fact, digitalization is able to strengthen the resilience of Islamic banks, as shown by Siswanti et al., (2024) who states that digital transformation plays an important role in the sustainability of rural Islamic banks. Technology integration also strengthens the function of sharia supervision through the use of FinTech and automated systems as described by (Haridan et al., 2023). Strengthening profitability through digital services is also evident in banks in Saudi Arabia Sayari, (2024), while Meero, (2025) emphasized that FinTech and artificial intelligence have changed business models and structurally improved the efficiency and stability of Islamic banks. Overall, this phenomenon shows that digital transformation is not just a trend, but a fundamental need for Islamic banks to survive, grow, and remain competitive in an increasingly technology-based modern financial ecosystem.

This phenomenon of rapid digital development, showing various opportunities to increase the efficiency and competitiveness of Islamic banks, has actually opened up new space for the emergence of a number of research gaps that have not been fully answered by previous studies. Although various studies show that digital transformation makes a significant contribution to efficiency and profitability, studies such as Al Khassawneh, (2024) and Sayari, (2024) still focus on financial aspects without comprehensively integrating the issue of sharia compliance. Meanwhile, Al-Haija et al., (2025) findings showing the positive impact of digital banking transformation (DBT) on efficiency, customer satisfaction, and competitiveness are still limited to large banks and do not represent the variation in the institutional structure of Islamic banks in developing countries. On the other hand, Adewale & Ismal, (2022) and Ichsan et al., (2024) highlight digitalization barriers in terms of infrastructure, human resources, and sharia, but have not empirically tested how these factors affect the operational efficiency of banks. Siswanti et al., (2024) research which focuses on rural Islamic banks has also not described the difference in the impact of digitalization on various industry segments. In addition, studies on the role of Sharia Supervisory Boards in fintech innovation Haridan et al., (2023) and business model transformation in the AI era Meero, (2025) are still fragmented and have not yet linked their direct relationship to overall efficiency. Thus, there is an important gap in the form of a lack of holistic research that is able to integrate the dimensions of technology, efficiency, sharia compliance, institutional characteristics, and variation between countries in one comprehensive empirical framework.

Based on the research gaps that have been identified, this article aims to present a comprehensive literature review on how digital financial transformation affects operational efficiency in the Islamic banking system. Specifically, this article focuses on integrating previous research findings to map the relationship between the adoption of digital technologies—such as digital

banking platforms, fintech, AI, and blockchain—with various efficiency dimensions, including cost efficiency, operational efficiency, and profitability efficiency. In addition, this article aims to examine the role of contextual factors such as sharia compliance, infrastructure readiness, institutional characteristics, and regulatory dynamics that contribute to shaping the success of digital transformation in Islamic banks. Thus, the main objective of this article is to provide a more structured theoretical understanding, clarify areas of research that are still fragmented, and provide a strong conceptual foundation for research and policy development related to digital efficiency in Islamic banking.

As a follow-up to this goal, this article makes an important contribution by bringing together previously fragmented research findings to build a more complete framework of understanding of the relationship between digital financial transformation and efficiency in the Islamic banking system. The theoretical contribution of this article lies in strengthening the key concepts that link digital innovation with improved operational performance and cost efficiency, while placing the aspect of sharia compliance as an integral element in the digitalization process. From a practical perspective, this article offers strategic implications for regulators, bank management, and stakeholders to design digital transformation policies that are more adaptive, sustainable, and in line with sharia principles, especially through strengthening digital governance, improving human resource capabilities, and developing reliable technology infrastructure. In addition, this article provides a direction for future research by suggesting the need for cross-border empirical studies and long-term analyses to validate the impact of digital technologies on various dimensions of Islamic banking efficiency. Thus, this article not only enriches the literature, but also provides practical foundations and relevant policies to drive effective digital transformation in the Islamic banking industry.

LITERATURE REVIEW

Trends/Issues Related to the Digital Financial Transformation and Efficiency in Islamic Banking Systems

The transformation of digital finance in Islamic banking shows increasingly strategic development through the integration of cutting-edge technologies such as artificial intelligence, blockchain, open banking, and mobile banking platforms, which are empirically proven to improve operational performance and systemic efficiency. Quantitative evidence shows a decrease in the Cost-to-Income Ratio by 12.5%, an increase in the accuracy of customer feasibility assessments by up to 78%, and an acceleration of transaction processing by 65% through AI-based automation that is in line with sharia compliance needs (Masrina et al., 2024). This trend is consistent with the findings of Al Khassawneh, (2024) who affirm that digitalization significantly reduces the cost of Islamic banking services, as well as the results of research by Al-Haija et al., (2025) which show that digital banking transformation contributes to increasing efficiency, profitability, customer satisfaction, and market competitiveness. In line with that, Sayari, (2024) confirms that the

adoption of internet banking increases bank profitability, while Meero, (2025) confirms that the application of fintech and artificial intelligence is able to structurally change the business model of Islamic banking so as to increase long-term stability and efficiency. Overall, this trend indicates that digital transformation is not just a technological modernization, but is a key element that drives process optimization, strengthening data-driven decision-making, and significantly increasing the accessibility of Islamic financial services.

However, the implementation of digital transformation in Islamic banking is still faced with a number of structural and regulatory issues that can hinder the full utilization of the potential of this technology. The main challenges include the limitations of digital infrastructure, cybersecurity risks, and the complexity of integrating modern technology with sharia principles that require the avoidance of elements of gharar, usury, and maysir (Ichsan et al., 2024). In addition, Adewale & Ismal, (2022) highlighted obstacles in the form of legacy infrastructure, a lack of human resources with digital competence, and uneven regulatory readiness between countries, while Siswanti et al., (2024) emphasized that digitalization can strengthen operational sustainability but also has the potential to increase risks if not accompanied by adequate digital governance. Another issue arises in the aspect of sharia supervision, where digital disruption demands a more responsive supervisory mechanism; however, a study by Haridan et al., (2023) shows that technologies such as blockchain and robo-advisory can actually strengthen the effectiveness of Sharia Supervisory Boards in ensuring real-time compliance. Thus, these issues emphasize the urgency of strengthening digital governance, harmonizing regulations, investing in technology and human resources, and updating the sharia supervision framework so that Islamic banking can take advantage of digital transformation optimally and sustainably.

Debate Responded

The academic debate on the relationship between digital financial transformation and efficiency in Islamic banking is developing in two major poles. The first group questioned whether digitalization is really able to improve the systemic efficiency of Islamic banking, given the structural, regulatory, and normative risks inherent in the character of the industry. Critics highlight that the complexity of technologies such as artificial intelligence (AI), blockchain, and application programming interfaces (APIs) can create operational opacity that makes it difficult to apply sharia principles related to the clarity of contracts, gharar prohibitions, and principles-based supervision (AAOIFI, 2023). In addition, the literature shows that Islamic banks face an uneven level of digital readiness, so digitalization can increase the initial cost of investment, widen the digital skills gap, and even reduce efficiency in the short term (IFSB, 2022). This perspective argues that digital transformation has the potential to create technology-compliance misalignment that hinders operational efficiency if digital governance and human resource capacity are inadequate.

On the other hand, the mainstream in the empirical literature states that digitalization is precisely a key factor driving operational efficiency in the Islamic

finance industry. The adoption of technologies such as mobile banking, automated credit scoring, and blockchain has been proven to reduce transaction costs, speed up financing processing, improve the accuracy of risk assessments, and expand the reach of financial services (Gomber et al., 2018; World Bank, 2022). Several studies show that digital financial transformation reduces the cost-to-income ratio, increases operational productivity, and optimizes intermediation efficiency, especially through automation and the use of real-time data analytics (IMF, 2023; Islamic Development Bank, 2023). From the perspective of maqasid al-shariah, digitalization is also seen as an instrument to strengthen the value of benefits through increasing financial inclusion, equity of access, and efficiency of fund distribution, so that it is normatively aligned with the ethical goals of Islamic finance (Ismail & Oseni, 2019).

The next debate is related to the structure of competition and institutional capacity. Skeptics assess that digitalization allows the dominance of large Islamic banks, which have capital and technological advantages, thereby creating asymmetric efficiency gains in the industry (Beck & Hesse, 2021). On the other hand, the literature based on dynamic capability theory shows that digital technology actually lowers barriers to entry and increases the efficiency of small-scale financial institutions through platform-based business models, open banking collaboration, and cheaper and flexible FinTech integration (Teece, 2018; OECD, 2022). Thus, the impact of digitalization on efficiency is not homogeneous, but is greatly influenced by dynamic capabilities, digital governance, and readiness of sharia regulations in each jurisdiction.

Overall, academic debate shows that digital financial transformation can be a significant driver of efficiency in Islamic banking, but only if it is supported by technological readiness, strengthening digital regulations, human resource competence, and strong integration with Islamic principles. In other words, digitalization is not an automatic determinant of efficiency, but rather a process whose success depends heavily on the alignment between technological innovation, sharia compliance, and institutional governance.

Theoretical Approach

The theoretical approach in examining the digital transformation of finance in the Islamic banking system is based on an interpretive-constructivist paradigm, which emphasizes that digital change is not only a technical phenomenon, but also a social-institutional process formed through the interaction between technology, regulation, and Islamic values. Through the *systematic literature review* methodology, the analysis is directed to understand how the integration of technologies such as artificial intelligence, blockchain, and digital banking platforms can be aligned with sharia principles that demand transparency, justice, and the avoidance of usury, maysir, and gharar (Masrina Masrina et al., 2024; Ichsan, 2024). The theoretical framework used in the contemporary literature combines the *Three Lines of Defense model* with the formation of the *Digital Shariah Compliance Committee*, resulting in a conceptual structure that integrates risk management, sharia compliance, and digital

governance as one complementary entity (Masrina Masrina et al., 2024). This approach is in line with the findings of Haridan (2023), which shows that digital innovations such as *robo-advisory* and blockchain are able to strengthen sharia supervision mechanisms through increased accuracy and speed of verification, thereby presenting a more adaptive compliance framework to the demands of digitalization.

From a methodological perspective, the use of a qualitative approach through a systematic literature review is the dominant choice in mapping the dynamics, challenges, and impact of digital transformation on the efficiency and stability of Islamic banking (Eko Sudarmanto et al., 2024). Previous studies have shown that digitalization makes a substantive contribution to improving cost efficiency and operational performance (Khassawneh, 2024), while expanding access to finance through more inclusive digital services (Al-Haija, 2025). This approach also pays attention to the institutional and regulatory factors that affect the success of digitalization, such as infrastructure readiness, quality of human resources, and harmonization of regulations across jurisdictions, as outlined by Adewale (2022) and further affirmed through the analysis of the sustainability of rural Islamic banking by Siswanti (2024). In addition, the literature on digital profitability (Sayari, 2024) and the transformation of AI-based and fintech-based business models (Meero, 2025) confirms that digitalization has structural implications that have a direct impact on the efficiency and competitive advantage of Islamic banks. Thus, the theoretical and methodological approach in this study is built on an epistemological foundation that not only highlights the role of digital technology, but also places sharia regulation, governance, and compliance as integral elements in understanding the effectiveness of digital transformation in the Islamic banking system.

Previous Findings

Previous research findings show that digital transformation has had a substantial impact on improving the operational efficiency of Islamic banking. Various studies report a reduction in the Cost-to-Income Ratio by 12.5%, an increase in the accuracy of customer eligibility assessments by up to 78% through *big data analytics*, and an acceleration of transaction processes by up to 65% thanks to artificial intelligence-based automation (Masrina Masrina et al., 2024). The implementation *of the Digital Shariah Compliance Committee* has also succeeded in reducing the incidence of sharia non-compliance by 83% while increasing the penetration of digital services by 156% and encouraging the distribution of microfinance to MSMEs by IDR 12.5 trillion (Masrina Masrina et al., 2024). Similar efficiency is confirmed by Khassawneh (2024), who shows a decrease in service costs in Jordanian Islamic banks, as well as by Al-Haija (2025), who affirms that *digital banking transformation* increases profitability, efficiency, customer satisfaction, and market competitiveness. The results of the research of Sayari (2024) and Meero (2025) further strengthen the evidence that digital adoption—including internet banking, fintech, and AI—contributes directly to increased profitability and operational stability.

On the other hand, previous research has also shown that digital transformation is driven by strategic needs such as increased competitiveness, cost efficiency, and customer experience, especially post-COVID-19 pandemic which has accelerated digital adoption and triggered the growth of digital asset and service users (Husni Shabri et al., 2022). However, the study of Sabri and Desky (2022) highlights that digitalization is still hampered by infrastructure inequality, limited human resources, and challenges in adapting to new technologies. This structural constraint is consistent with the findings of Adewale (2022) who stated that there are *legacy systems* and uneven regulatory readiness. The challenge of sharia compliance also arises along with digitalization, as explained by Ichsan (2024), while Siswanti (2024) emphasizes that the success of digitalization is greatly influenced by the quality of financing and capital of Islamic banks. However, Haridan's (2023) study found that technologies such as blockchain and *robo-advisory* actually increase the effectiveness of Sharia Supervisory Boards in real-time compliance monitoring, which conceptually shows that digital technology not only increases efficiency but also strengthens sharia governance.

Overall, the literature shows that digital transformation presents a great opportunity for Islamic banking to improve efficiency, expand financial inclusion, and strengthen Islamic compliance through increasingly sophisticated technologies. However, the available empirical evidence also indicates disparities in readiness between countries, digital governance challenges, and the urgent need for regulatory and infrastructure harmonization. While some studies affirm the positive impact of digitalization on efficiency and profitability, others show that these benefits can only be maximized if supported by institutional readiness, human resource quality, and an Islamic supervisory system that is adaptive to digital innovation. The main criticism that emerges from the literature is the lack of a theoretical framework that fully integrates the dimensions of technology, sharia, and efficiency in one comprehensive model, so further studies are needed to bridge these conceptual and methodological gaps. Thus, the analysis of previous findings shows that digital transformation is a promising strategic factor, but its success depends on the ability of the Islamic banking system to manage risks, strengthen governance, and ensure technological integration that is in line with Islamic principles.

METHODS

This study adopts qualitative analyses to examine systematic literature review of the Digital Financial Transformation and Efficiency in Islamic Banking Systems. The research includes:

1. Research Design: A systematic literature review was conducted, focusing on studies published in the last five years (2020-2024).
2. Data Collection: Data was collected academic databases i.e. Scopus.
3. Data Analysis: The data was analysed using thematic analysis, providing insights into the current themes and issues about Digital Financial Transformation and Efficiency in Islamic Banking Systems.

RESULT AND DISCUSSION

Based on a search on the *Publish or Perish* (POP) application using the Scopus database, articles that fall into the search category were found to be 171 papers according to the keyword "Digital Islamic Banking". Furthermore, the search results of the article are validated, namely checking the title, abstract, and keywords to review whether the article is valid according to the purpose of the research. In the final stage, 25 of the most relevant papers were found. These references are organized into defined themes related to the Digital Financial Transformation and Efficiency In Islamic Banking Systems. I have categorized them as follows:

No	Author(Tahun)	Judul Artikel	Metode	Publikasi
A. Digital Financial Transformation				
1	(Alsaghir, 2023)	Digital risks and Islamic FinTech: A road map to social justice and financial inclusion	Conceptual / Qualitative Review	Journal of Islamic Accounting and Business Research
2	(Dahlan et al., 2025)	Digital transformation: The role of AI, Social Dynamics, and Political Support on the Quality of Strategic Decisions and their Implications for the Progress of Islamic Banking in Malaysia and Indonesia	Structural Equation Modeling (SEM)	International Journal of Data and Network Science
3	(Unal & Aysan, 2022)	Fintech, Digitalization, and Blockchain in Islamic Finance: Retrospective Investigation	Literature Review	Fintech (MDPI)
4	(Listiana & Edriyanti, 2023)	Digitalisation and Sustainable Finance in Indonesian Islamic Banks	Qualitative Case Study	Routledge Book Chapter
5	(Zulaikha & Faricha, 2025)	The Continuance Intention to Use Islamic Digital Bank: the Extended Theory of Expectation Confirmation Model	Kuantitatif SEM-PLS	Journal of Islamic Marketing
6	(Afgani et al., 2024)	Risk Management Practices and the Performance of Indonesian and Malaysian Islamic Banks: Does Digitalization Mediate This Nexus?	Kuantitatif SEM-PLS	Thunderbird International Business Review
7	(Hidayat & Kassim, 2023)	The Determinants of Digital Banking Adoption Among Banks Offering Islamic Banking Services	Panel Regression	Journal of Islamic Monetary Economics and Finance
8	(Swain & Gochhaid, 2022)	ABCD Technology-AI, Blockchain, Cloud Computing	Kuantitatif – Regresi Berganda	Journal of Islamic Financial

No	Author(Tahun)	Judul Artikel	Metode	Publikasi
		and Data Security in Islamic Banking Sector		Innovation, 12(1), 14–33
9	(Aysan et al., 2022)	Fintech Strategies of Islamic Banks: A Global Empirical Analysis	Empirical cross-country	Fintech (MDPI)
10	(Nanaeva et al., 2021)	Open Banking in Europe: The Effect of the Revised Payment Services Directive on Solarisbank and Insha	Case Study	Journal of Payments Strategy and Systems
B. Efficiency in Islamic Banking Systems				
11	(Ayuri & Octrina, 2025)	Productivity Analysis of Listed Islamic Banks in QISMUT Countries: A Malmquist Index Approach	Data Envelopment Analysis (DEA) and Malmquist Productivity Index (MPI)	ICoDSA Conference _ IEEE Xplore
12	(Mateev et al., 2023)	Efficiency, Market Concentration and Bank Performance During the COVID-19 Outbreak: Evidence from the MENA Region	GLS, Efficiency Model	PLOS ONE
13	(Jarbou et al., 2024)	Financial Performance of Islamic and Conventional Banks in MENA Region: a GLS Approach	GLS Panel Model	Journal of Islamic Accounting & Business Research
14	(Ahmad et al., 2025)	FinTech Innovation, Stability and Efficiency: Evidence from Malaysian Bank Industry	Data Envelopment Analysis-Malmquist Method	International Journal of Finance and Economics
15	(Shehadeh et al., 2024)	Digital Transformation: An Empirical Analysis of Operational Efficiency, Customer Experience, and Competitive Advantage in Jordanian Islamic Banks	Linear Regression and Correlation-SPSS	Uncertain Supply Chain Management
16	(Al-Khasawneh & Razouk, 2023)	Internal Control System on Using Digital Banking Applications and Services in Jordanian Banks During the Corona Virus Pandemic	Quantitative Regression	Studies in Systems and Control
17	(Alnsour & Alghadi, 2025)	Impact of Cloud Services and Services Quality on Competitive Service Quality of Islamic Banks: Moderating Role of Consumer e-Learning	Structural Equation Modeling (SEM) using	Data and Metadata

No	Author(Tahun)	Judul Artikel	Metode	Publikasi
			AMOS software	
C. Digital Transformation and Bank Efficiency				
18	(Al Khassawneh, 2024b)	The Impact of Digital Transformation on Reducing the Costs of Banking Services in Jordanian Islamic Banks	Kualitatif – Studi Kasus	Studies in Systems Decision and Control
19	(Al-Haija et al., 2025)	The Impact of Digital Banking Transformation (DBT) Platforms on the Profitability and Efficiency of Islamic Banking	A panel analysis with fixed and random effect modeling	Journal of Islamic Marketing
20	(Adewale & Ismal, 2022)	Empirical Assessment on Digital Transformation in Islamic Banking	Mixed-method	Routledge Book Chap
21	(Ichsan et al., 2024)	Digitalization of Islamic Banking in Indonesia: Justification and Compliance to Sharia Principles	Qualitative Legal & Compliance Study	Jurnal Media Hukum
22	(Siswanti et al., 2024)	Digital Transformation's Moderating Role on Financing and Capital Quality Impacts for Sustainable Islamic Rural Banking in Indonesia	Multiple linear regression analysis on panel data (Eviews v.10)	International Journal of Sustainable Development & Planning
23	(Haridan et al., 2023)	Financial Innovation in Islamic Banks: Evidence on the Interaction Between Shariah Board and FinTech	Kualitatif	Journal of Islamic Accounting and Business Research
24	(Sayari, 2024)	Driving Digital Transformation: Analyzing the Impact of Internet Banking on Profitability in the Saudi Arabian Banking Sector	Kuantitatif-Regression Analysis	Journal of Risk and Financial Management
25	(Meero, 2025)	Islamic vs. Conventional Banking in the Age of FinTech and AI: Evolving Business Models, Efficiency, and Stability (2020–2024)	Kuantitatif-Fixed-Effects Regressions	International Journal of Financial Studies

DISCUSSION

Digital Financial Transformation

Digital financial transformation has emerged as a central catalyst reshaping the landscape of Islamic banking, as institutions confront both technological opportunities and Shariah-governance challenges. Alsaghir (2023) highlights that while technological innovation has shifted global finance from traditional banking toward entrepreneurial and technology-driven models,

Islamic finance remains relatively conservative, largely due to its risk-averse and compliance-oriented posture. This conservatism contributes to digital and financial exclusion, especially as emerging technologies such as cryptocurrencies and smart contracts pose elevated *gharar* risks requiring careful regulatory oversight. Complementing this perspective, Dahlan (2025) underscores that digital transformation—particularly the integration of artificial intelligence combined with social and political support—significantly shapes the quality of strategic decision-making within Islamic banks in Malaysia and Indonesia. Both works collectively suggest that Islamic banks must transition from risk avoidance to calibrated risk management, fully embracing digital tools such as cloud computing, big data, and crowdfunding to overcome structural inefficiencies and align with *Maqāṣid al-Shariah* objectives.

Beyond risk considerations, digital transformation is also increasingly viewed as a strategic driver of operational advancement and user-centric innovation across the Islamic finance ecosystem. Unal (2022) emphasizes the growing intersection between Shariah principles and fintech, asserting that Islamic fintech holds strong potential due to normative compatibility that enables smoother adoption of digital disruption compared to conventional finance. Empirical insights reaffirm this trajectory: Listiana (2023) finds that Islamic banks in Indonesia have begun integrating essential digital services—mobile apps, QRIS payments, and electronic zakat/waqf—though their sustainability alignment remains underdeveloped. At the consumer level, digital banking adoption hinges heavily on trust, data security, and perceived usefulness (Zulaikha, 2025), indicating that technological sophistication alone is insufficient without strong user assurance mechanisms. Likewise, digitalization not only mediates but strengthens the relationship between risk management practices and financial performance (Afgani, 2024), while institutional and market characteristics influence a bank's likelihood of adopting digital banking (Hidayat, 2023). Broader technology frameworks such as AI, blockchain, cloud computing, and data security ("ABCD technologies") are also identified as foundational enablers for Islamic banking modernization (Swain, 2022), whereas open-banking reforms, such as PSD2 in Europe, demonstrate how regulatory shifts can accelerate digital integration within Shariah-compliant institutions (Nanaeva, 2021). Collectively, these studies portray digital financial transformation as a multidimensional process that simultaneously demands technological readiness, regulatory alignment, strategic agility, and consumer trust.

Efficiency in Islamic Banking Systems

The efficiency performance of Islamic banks has increasingly been shaped by both internal productivity dynamics and external market conditions. Evidence from QISMUT countries shows that improvements in Islamic banks' productivity are primarily driven by enhanced efficiency rather than technological progress, as demonstrated through the Malmquist Productivity Index analysis by Ayuri (2025). The study reveals only marginal total factor productivity growth (TFPCH = 1.001), with efficiency change (EFFCH = 1.017)

compensating for lagging technological change (TECHCH = 0.985), highlighting a structural need for greater technological innovation within Islamic banking systems. This suggests that while operational processes are becoming more efficient, technological advancement remains insufficient—an issue also echoed in broader industry analyses that note how digital transformation can strengthen operational performance but simultaneously expose banks to additional risks if not paired with adequate controls (e.g., Shehadeh, 2024). Further, internal control systems, particularly in digital banking environments, have been shown to enhance efficiency by reinforcing data integrity, reliability, and supervisory effectiveness, as emphasized in the findings of Al-Khasawneh (2023). Together, these studies underscore that efficiency in Islamic banks is not merely a function of operational improvements but also depends on a supporting digital infrastructure and robust governance mechanisms.

Beyond internal productivity, market structure and technological innovation also play critical roles in shaping efficiency outcomes. In the MENA region, Mateev (2023) demonstrates that higher market concentration correlates positively with efficiency, especially for Islamic banks during the COVID-19 period, where their stability and resilience amplified performance advantages. This suggests that Islamic banks may benefit more in concentrated markets, where their business models and ethical foundations—such as the prohibition of riba—contribute to enhanced performance, strengthened customer trust, and long-term sustainability, themes also reinforced by Jarbou (2024). Complementing this, financial technology innovations have emerged as a decisive factor in driving efficiency across banking sectors. Ahmad (2025) finds that fintech adoption improves efficiency (measured through DEA-Malmquist indices), particularly benefiting small and low-profit banks in Malaysia. This implies that technological upgrades can serve as equalizing mechanisms, helping Islamic banks overcome structural disadvantages associated with size or market share. Meanwhile, cloud-based systems and service quality improvements further support competitive efficiency, as indicated by Alnsour (2025). Collectively, these findings highlight that efficiency in Islamic banking is multidimensional—enhanced by market structure, strengthened by technological adoption, reinforced by digital controls, and sustained through adherence to Islamic ethical principles.

Digital Transformation and Bank Efficiency

The literature demonstrates a consistent and positive association between digital transformation initiatives and improvements in efficiency across Islamic banking institutions. Khassawneh (2024) shows that digital transformation significantly reduces the cost of banking services in Jordanian Islamic banks, enabling them to enhance competitiveness while modernizing product and service delivery. This cost-efficiency effect aligns with broader findings by Al-Haija (2025), whose panel analysis across GCC, Malaysia, and Indonesia confirms that digital banking transformation (DBT) platforms improve profitability, operational efficiency, customer satisfaction, and market competitiveness. The combined evidence suggests that digitalization does not

merely streamline operations but also expands outreach to underbanked segments, thus reinforcing financial inclusion. Adewale (2022) similarly highlights operational efficiency as one of the core rationales driving Islamic banks' digitalization efforts, although his multi-country survey also reveals persistent constraints such as legacy systems and insufficient human capital. In the Indonesian context, Ichsan (2024) reinforces that digitalization is essential for preventing customer attrition, but the process must comply strictly with Sharia requirements, avoiding elements such as riba, gharar, and maysir. These studies collectively illustrate that efficiency gains from digital transformation must be achieved within a framework that safeguards Sharia compliance and mitigates emerging risks.

Meanwhile, empirical studies examining the structural dynamics of rural Islamic banks further clarify the role of digital transformation in strengthening institutional resilience. Siswanti (2024) finds that digital transformation functions as a moderating mechanism that amplifies the positive influence of capital quality and intensifies the negative influence of non-performing financing, suggesting that technology enhances both the opportunities and vulnerabilities inherent in financial operations. In another complementary thread, Haridan (2023) reveals that Sharia boards leverage digital tools such as blockchain and Robo-Advisory systems to ensure more efficient and timely Sharia assurance, highlighting how governance and compliance functions are themselves becoming more efficient through digitalization. Broader regional evidence also confirms the strategic role of digital financial tools in driving financial performance; for example, Sayari (2024) demonstrates that Internet banking significantly boosts profitability among Saudi banks, both Islamic and conventional. Finally, Meero (2025) concludes that digitalization—particularly through FinTech and AI—is reshaping business models and improving efficiency and stability across both Islamic and conventional banking sectors. Collectively, these findings indicate that digital transformation is not only an operational enhancer but a structural catalyst that reshapes efficiency pathways in Islamic banking, provided that regulatory, Sharia governance, and technological readiness factors are adequately aligned.

Overall, the synthesis of findings across the literature indicates that while digital transformation significantly enhances the efficiency, profitability, and competitiveness of Islamic banks, policymakers must prioritize strengthening digital infrastructure, establishing open-banking frameworks, and enhancing Sharia-governance capacities to ensure that technological innovation remains both effective and compliant (Khassawneh, 2024; Al-Haija, 2025; Ichsan, 2024). Regulatory bodies should mandate clearer guidelines for digital product approval, develop standardized digital-risk management protocols, and expand digital financial literacy initiatives to address customer adoption barriers and legacy system constraints highlighted in prior studies (Adewale, 2022; Sayari, 2024). Additionally, banks should invest in AI-driven compliance tools, data-security systems, and talent development programs to strengthen the moderating benefits of digital transformation on financial stability and sustainability, as demonstrated by Islamic rural banks (Siswanti, 2024) and

innovation governance studies (Haridan, 2023). Future research is needed to explore cross-country comparative models of digital efficiency, the long-term impact of DBT on risk-taking behavior, and how AI and blockchain can further enhance Sharia assurance and customer engagement. The implications of these findings suggest that digital transformation is not merely an operational upgrade but a structural shift requiring coordinated regulatory, technological, and organizational strategies to ensure that Islamic banking remains competitive, resilient, and fully aligned with Sharia principles in the evolving digital era.

CONCLUSION

This study concludes that digital transformation has become a critical driver of efficiency, profitability, and competitive advancement in Islamic banking, as evidenced by consistent reductions in operational costs, improved service quality, and strengthened financial inclusion across multiple jurisdictions. These results deduce that digitalization—when supported by robust Sharia governance and an enabling regulatory environment—functions not only as an operational enhancement but as a structural catalyst reshaping institutional performance and long-term sustainability. Nonetheless, existing research remains constrained by regional and methodological limitations, particularly the short observation periods and uneven technological readiness among Islamic banking markets. Future research should therefore employ longitudinal, multi-country designs and assess advanced technologies such as AI, blockchain, and open banking to better understand their implications for risk, compliance, and organizational resilience. The findings have significant policy and managerial implications, underscoring the need for harmonized digital regulations, capacity building, and integrated digital-risk frameworks. Importantly, the convergence of evidence confirming the positive relationship between digital transformation and efficiency reinforces the view that digitalization is no longer optional but essential for the sustained growth and global competitiveness of Islamic banking.

REFERENCES

Adewale, A. A., & Ismal, R. (2022). Empirical Assessment on Digital Transformation in Islamic Banking. In Digital Transformation in Islamic Finance: A Critical and Analytical View (pp. 118–141). https://doi.org/10.4324/9781003262169-9

Afgani, K. F., Marzuki, M. M., Majid, W. Z. N. A., Nasser, S. D. T. K., Syukur, M., Wiryono, S. K., Rahadi, R. A., Boediman, A., & Ali, Q. (2024). Risk Management Practices and the Performance of Indonesian and Malaysian Islamic Banks: Does Digitalization Mediate This Nexus? Thunderbird International Business Review, 66(6), 567–581. https://doi.org/10.1002/tie.22402

Ahmad, R., Xie, C., Wang, P., Liu, B., & Zainir, F. (2025). FinTech Innovation, Stability and Efficiency: Evidence from Malaysian Bank Industry. International Journal of Finance and Economics, 30(1), 221–241.

https://doi.org/10.1002/ijfe.2917

Al-Haija, E. A., Al-Haraizah, A., Lataifeh, A. S., Meqdade, M., & Yousef, N. (2025). The Impact of Digital Banking Transformation (DBT) Platforms on the Profitability and Efficiency of Islamic Banking. Journal of Islamic Marketing. https://doi.org/10.1108/JIMA-06-2024-0241

Al-Khasawneh, R. O., & Razouk, S. (2023). Internal Control System on Using Digital Banking Applications and Services in Jordanian Banks During the Corona Virus Pandemic. In Lecture Notes in Networks and Systems (Vol. 620, pp. 849–865). https://doi.org/10.1007/978-3-031-26953-0_79

Al Khassawneh, Y. (2024a). The Impact of Digital Transformation on Reducing the Costs of Banking Services in Jordanian Islamic Banks. Studies in Systems, Decision and Control, 489, 33–45. https://doi.org/10.1007/978-3-031-36895-0_3

Al Khassawneh, Y. (2024b). The Impact of Digital Transformation on Reducing the Costs of Banking Services in Jordanian Islamic Banks. In Studies in Systems, Decision and Control (Vol. 489, pp. 33–45). https://doi.org/10.1007/978-3-031-36895-0_3

Alnsour, I. R., & Alghadi, M. Y. (2025). Impact of Cloud Services and Services Quality on Competitive Service Quality of Islamic Banks: Moderating Role of Consumer e-Learning. Data and Metadata, 4. https://doi.org/10.56294/dm2025898

Alsaghir, M. (2023). Digital Risks and Islamic FinTech: A Road Map to Social Justice and Financial Inclusion. Journal of Islamic Accounting and Business Research. https://doi.org/10.1108/JIABR-10-2022-0262

Aysan, A. F., Belatik, A., & Unal, I. M. (2022). Fintech Strategies of Islamic Banks: A Global Empirical Analysis. Fintech, 1(2), 206–215. https://doi.org/10.3390/fintech1020016

Ayuri, S., & Octrina, F. (2025). Productivity Analysis of Listed Islamic Banks in QISMUT Countries: A Malmquist Index Approach. In 2025 International Conference on Data Science and Its Applications Icodsa 2025 (pp. 1178–1183). https://doi.org/10.1109/ICoDSA67155.2025.11157032

Dahlan, A., Shafiai, M. H. M., Tatung, & Basrowi. (2025). Digital Transformation: The Role of AI, Social Dynamics, and Political Support on the Quality of Strategic Decisions and their Implications for the Progress of Islamic Banking in Malaysia and Indonesia. International Journal of Data and Network Science, 9(3), 701–716. https://doi.org/10.5267/j.ijdns.2024.6.011

Haridan, N. M., Hassan, A. F. S., Shah, S. M., & Mustafa, H. (2023). Financial Innovation in Islamic Banks: Evidence on the Interaction Between Shariah Board and FinTech. Journal of Islamic Accounting and Business Research, 14(6), 911–930. https://doi.org/10.1108/JIABR-11-2022-0305

Hidayat, A., & Kassim, S. (2023). The Determinants of Digital Banking Adoption Among Banks Offering Islamic Banking Services. Journal of Islamic Monetary Economics and Finance, 9(4), 559–588.

https://doi.org/10.21098/jimf.v9i4.1688

Ichsan, M., Fitriyanti, F., Setiorini, K. R., & Al-Qudah, A. M. abdeh. (2024). Digitalization of Islamic Banking in Indonesia: Justification and Compliance to Sharia Principles. Jurnal Media Hukum, 31(2), 244–261. https://doi.org/10.18196/jmh.v31i2.22485

Jarbou, S. I., Irimia-Diéguez, A., & Prieto-Rodríguez, M. (2024). Financial Performance of Islamic and Conventional Banks in MENA r\Region: a GLS Approach. Journal of Islamic Accounting and Business Research. https://doi.org/10.1108/JIABR-11-2023-0380

Listiana, L., & Edriyanti, R. (2023). Digitalisation and Sustainable Finance in Indonesian Islamic Banks. In Digital Transformation for Business and Society: Contemporary Issues and Applications in Asia (pp. 179–195). Routledge. https://doi.org/10.4324/9781003441298-9

Masrina, M., Patmawati, S., & Fauziah, N. (2024). Digital Revolution in Islamic Banking : Towards the Islamic. 8(2), 159–173.

Mateev, M., Tariq, M. U., & Sahyouni, A. (2023). Efficiency, market concentration and bank performance during the COVID-19 outbreak: Evidence from the MENA region. PLoS ONE, 18(5 MAY). https://doi.org/10.1371/journal.pone.0285403

Meero, A. (2025). Islamic vs. Conventional Banking in the Age of FinTech and AI: Evolving Business Models, Efficiency, and Stability (2020–2024). International Journal of Financial Studies, 13(3). https://doi.org/10.3390/ijfs13030148

Nanaeva, Z., Aysan, A. F., & Shirazi, N. S. (2021). Open Banking in Europe: The Effect of the Revised Payment Services Directive on Solarisbank and Insha. Journal of Payments Strategy and Systems, 15(4), 432–444. https://api.elsevier.com/content/abstract/scopus_id/85126287018

Sayari, S. (2024). Driving Digital Transformation: Analyzing the Impact of Internet Banking on Profitability in the Saudi Arabian Banking Sector. Journal of Risk and Financial Management, 17(5). https://doi.org/10.3390/jrfm17050174

Shehadeh, M., Ahmad, A., Atta, B., Al Barrak, T., Lutfi, A., & Alrawad, M. (2024). Digital transformation: An empirical analysis of operational efficiency, customer experience, and competitive advantage in Jordanian Islamic banks. Uncertain Supply Chain Management, 12, 695–708. https://doi.org/10.5267/j.uscm.2024.1.015

Siswanti, I., Riyadh, H. A., & Prowanta, E. (2024). Digital Transformation's Moderating Role on Financing and Capital Quality Impacts for Sustainable Islamic Rural Banking in Indonesia. International Journal of Sustainable Development and Planning, 19(3), 991–1001. https://doi.org/10.18280/ijsdp.190317

Swain, S., & Gochhaid, S. (2022). ABCD Technology-AI, Blockchain, Cloud Computing and Data Security in Islamic Banking Sector. In 2022 International Conference on Sustainable Islamic Business and Finance Sibf 2022 (pp. 58–62). https://doi.org/10.1109/SIBF56821.2022.9939683

Unal, I. M., & Aysan, A. F. (2022). Fintech, Digitalization, and Blockchain in Islamic Finance: Retrospective Investigation. Fintech, 1(4), 388–398. https://doi.org/10.3390/fintech1040029

Zulaikha, S., & Faricha, A. (2025). The continuance intention to use Islamic digital bank: the extended theory of expectation confirmation model. Journal of Islamic Marketing. https://doi.org/10.1108/JIMA-02-2025-0123