

# Digital Transformation of Islamic Banks through E-Business to Support Green Banking Principles

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**Abstract:** The digital transformation of Islamic banking through e-business has become a key strategy for enhancing operational efficiency and expanding financial service accessibility. Digitalization enables Islamic banks to adopt technologies such as mobile banking, artificial intelligence, and big data analytics to improve service quality and compliance with Sharia principles. Additionally, the **Green Banking** concept is reinforced through paper reduction, energy efficiency, and environmentally friendly investments. However, challenges such as regulations, infrastructure, and digital literacy remain significant obstacles. Therefore, solutions such as digital financial education, collaboration with Islamic fintech, and strengthening policies and digital security are needed to ensure the sustainability of this transformation. With the right strategies, the digitalization of Islamic banking can support sustainable economic growth while remaining aligned with Islamic principles.

**Keywords:** Digitalization; Islamic Banking; E-Business; Green Banking; Islamic Fintech

## 1. Introduction

Digital transformation has become a critical necessity for the banking industry, including Islamic banks, in addressing the challenges of the modern era. Advances in information technology enable Islamic banks to adopt e-business-based systems to enhance operational efficiency and expand the reach of financial services. This digitization not only provides convenience for customers but also assists banks in implementing Shariah principles with greater transparency and accuracy. Through e-business, Islamic banks can offer more innovative products and services that align with Islamic values (Ardianto et al., 2024).

Alongside the growing awareness of environmental sustainability, the concept of Green Banking has increasingly gained prominence within the financial sector, including Islamic banking. This principle emphasizes environmentally friendly banking practices, such as reducing paper usage, optimizing energy consumption, and financing sectors that support sustainability. Digital transformation via e-business enables Islamic banks to reduce their carbon footprint by adopting digital-based services such as mobile banking, internet banking, and cashless transactions. Thus, the integration of technology in Islamic banking services can make a tangible contribution to environmental preservation (Tartila, 2021).

The utilization of digital technology in Islamic banks also plays a vital role in enhancing financial efficiency and inclusivity. Digitization allows banks to reach a broader population, particularly those residing in remote areas who lack access to conventional banking services. Through e-business, Islamic banks can provide financial services that are more accessible, faster, and compliant with Shariah principles. Innovations such as Shariah-based payment systems, halal crowdfunding, and Shariah-compliant digital investments further strengthen the position of Islamic banks in facing global competition (Syafitri and Nasution, 2023).

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In addition to enhancing efficiency and inclusivity, digital transformation also helps improve security and transparency within Islamic banking. By implementing technologies such as blockchain and artificial intelligence, Islamic banks can ensure that transactions comply with Shariah principles and are free from elements of *riba* (usury), *gharar* (excessive uncertainty), and *maysir* (gambling). Data security and customer privacy can be better safeguarded through more advanced digital security systems. This further strengthens public trust in Islamic banking services and promotes the broader growth of the Shariah-based financial industry (Aripin and Fatawa, 2022).

With these various benefits, digital transformation through e-business represents a strategic step for Islamic banks in supporting the principles of Green Banking. The implementation of technology in Islamic banking not only enhances operational efficiency and service accessibility but also contributes to environmental sustainability efforts. Therefore, the synergy between digitalization and sustainability must be continuously reinforced so that Islamic banks can fulfill their role as modern, inclusive financial institutions oriented toward balancing profitability with social and environmental responsibility (Mawarni et al., 2022).

## **2. Preliminaries or Related Work or Literature Review**

### **2.1. Digital Transformation in Islamic Banking**

Digital transformation in Islamic banking represents a strategic initiative to enhance efficiency and competitiveness in the digital era. Research indicates that the implementation of digital technologies enables Islamic banks to provide faster, more transparent services that comply with Shariah principles. Innovations such as mobile banking, internet banking, and Shariah-based digital payment systems have accelerated the broader adoption of financial services. This transformation also plays a vital role in improving financial inclusion for communities previously underserved by conventional banking services (Winansis, 2020).

### **2.2. E-Business in Islamic Banking**

E-business in Islamic banking involves leveraging technology to deliver financial services digitally, encompassing both operational aspects and customer interactions. Studies demonstrate that e-business reduces reliance on physical-based services and enhances service accessibility across all societal segments. Technologies like artificial intelligence (AI) and big data analytics support more personalized and optimized customer services. Through e-business, Islamic banks can strengthen their competitiveness amid changing consumer preferences that increasingly prioritize digital-based services (Cindy et al., 2022).

### **2.3. Green Banking and Environmental Sustainability**

Green Banking refers to the integration of sustainability principles within banking operations and financial policies aimed at minimizing adverse environmental impacts. Islamic banks, with their emphasis on balance and sustainability, can implement this concept through digitalization of services, investment in environmentally friendly sectors, and green financing policies. Research indicates that Green Banking initiatives help reduce the overuse of natural resources, such as minimizing paper usage in banking transactions and improving energy efficiency in bank offices. Thus, Islamic banks can function as financial institutions focused not only on profitability but also on environmental sustainability (Ria et al., 2023).

### **2.4. Security and Transparency in Digital Islamic Banking**

Security and transparency are critical aspects in the application of digital technologies in Islamic banking. Recent studies reveal that adopting technologies such as blockchain can enhance customer trust by ensuring transactions comply with Shariah principles and are free from *gharar* (uncertainty) or ambiguity. Furthermore, the use of artificial intelligence (AI) for fraud detection and risk analysis improves data security and mitigates cybercrime risks. Enhanced transparency enables Islamic banking to uphold Islamic values in every financial transaction (Iswanto et al., 2023).

### **2.5. Challenges and Opportunities in Islamic Bank Digitalization**

Although digitalization offers numerous benefits to Islamic banks, several challenges must be addressed, including regulatory constraints, technological readiness, and digital literacy among the public. Research highlights that limitations in digital infrastructure and insufficient public understanding of

Shariah-based financial services are major obstacles in e-business implementation. Nevertheless, significant growth opportunities remain, especially with the increasing number of internet and mobile banking users across various countries. With appropriate strategies, Islamic banks can optimize digital technologies to enhance competitiveness while strengthening their role in supporting sustainable finance (Mulyana et al., 2024).

### 3. Proposed Method

This study employs a qualitative descriptive approach to analyze the digital transformation of Islamic banks through e-business in supporting the principles of Green Banking. Data were collected through a literature review encompassing scientific journals, books, Islamic banking industry reports, and regulations related to digitalization and sustainability in the financial sector. This approach aims to understand how the implementation of digital technology in Islamic banking can enhance operational efficiency, expand financial inclusion, and contribute to environmental sustainability. The analysis involved examining various theories, concepts, and best practices applied by Islamic banks in adopting e-business, as well as identifying challenges and opportunities in implementing digitalization oriented toward Green Banking principles (Fathoni, 2006).

### 4. Results and Discussion

Digital transformation in Islamic banking has brought significant changes to operational systems and financial services. Islamic banks now leverage digital technology to enhance efficiency, accelerate transaction processes, and expand service reach to the wider community. The implementation of digital services such as mobile banking and internet banking enables customers to conduct transactions anytime and anywhere without the need to visit branch offices. Additionally, digital systems allow for the automation of various banking processes, such as transaction verification and risk management, which previously required manual intervention (Shabari, 2022).

The implementation of e-business in Islamic banking has brought significant changes in the way banks operate and interact with customers. The digitalization of services enables Islamic banks to offer more efficient, faster, and flexible banking solutions. Through e-business, banks can provide services such as mobile banking, internet banking, and Sharia-compliant digital applications that facilitate customers in conducting financial transactions anytime and anywhere. Moreover, the adoption of cloud computing systems helps banks improve scalability and operational efficiency, thereby reducing administrative costs and increasing service accessibility for the wider community.

Artificial intelligence (AI) and big data analytics play a crucial role in the development of e-business in Islamic banking. AI enables banks to automate various processes, such as customer service through AI-based chatbots, which provide quick responses to customer inquiries. Meanwhile, big data analytics assists banks in analyzing customer transaction patterns to offer product recommendations tailored to their needs. By leveraging these technologies, Islamic banks can provide more personalized services aligned with Islamic financial principles, such as halal financing customized to customers' risk profiles (Fajri, 2023).

Security and transparency in e-business are also top priorities in Islamic banking. The use of blockchain technology ensures that each transaction is securely recorded and immutable, thereby enhancing customer trust in digital banking services. In addition, biometric verification systems and data encryption help protect sensitive customer information from cyber threats. With robust security infrastructure, Islamic banks can guarantee that every transaction complies with Sharia principles and is free from practices that contradict Islamic ethics (Ruslang et al., 2020).

Despite its various benefits, the implementation of e-business in Islamic banking still faces several challenges, such as low digital literacy among customers and limited technological infrastructure in certain regions. Therefore, Islamic banks need to continuously develop digital education strategies and strengthen partnerships with Sharia-compliant fintech firms to expand service coverage. With an appropriate approach, e-business can serve as an effective tool to promote Sharia financial inclusion and enhance a more innovative, transparent, and

sustainable banking ecosystem. Beyond efficiency, digital transformation also improves transparency in Islamic banking operations. Through the use of technologies such as blockchain, smart contracts, and artificial intelligence (AI), banks can ensure that every transaction complies with Sharia principles, including being free from *riba* (usury), *gharar* (uncertainty), and *maysir* (gambling). These technologies also enable real-time auditing and transaction monitoring, thereby increasing customer trust in Islamic finance. Digital-based systems also assist banks in reducing human error, improving record accuracy, and ensuring compliance with applicable regulations (Akil, 2015).

The development of Sharia-based financial technology (fintech) also supports the digital transformation in this sector. Collaboration between Islamic banks and fintech companies enables the creation of innovative products such as Sharia-compliant peer-to-peer (P2P) lending, halal crowdfunding, and digital wallets aligned with Islamic financial principles. Through these technologies, Islamic banking can reach segments of the population previously underserved by conventional banking services, particularly in remote areas or regions with limited access to financial services (Husna, 2020).

However, despite the numerous benefits of digital transformation, several challenges remain for Islamic banks, including low digital literacy among customers and insufficient technological infrastructure. Therefore, Islamic banks must continuously innovate in digital education and increase investments in cybersecurity systems to protect customer data and transactions. With appropriate strategies, digital transformation can further strengthen the position of Islamic banking as an inclusive, efficient, and Sharia-compliant financial solution.

The implementation of e-business in Islamic banking makes a significant contribution to the principles of Green Banking, particularly by reducing reliance on physical documents. Service digitalization allows Islamic banks to adopt paperless systems, where transactions, account openings, and banking administration can be conducted online without requiring printed documents. This not only decreases paper usage but also reduces operational costs and enhances service efficiency. By minimizing the use of physical resources, Islamic banking can play a vital role in environmental preservation, consistent with Islamic values that emphasize responsibility toward nature (Mardona et al., 2024).

In addition to reducing paper usage, e-business enables Islamic banking to optimize energy consumption through digital transformation. Cloud computing-based banking systems and transaction automation reduce the need for extensive physical infrastructure, thereby lowering electricity consumption and other energy resources. The use of digital platforms also minimizes customers' travel to branch offices, ultimately decreasing the carbon footprint associated with transportation activities. By implementing these strategies, Islamic banks can enhance energy efficiency while providing faster and more convenient services to customers.

Support for Green Banking is also evident in environmentally based investment and financing policies. Through e-business, Islamic banks can channel financing to sectors that promote a sustainable economy, such as renewable energy, organic agriculture, and ecology-based enterprises. Digital technology facilitates the selection and monitoring processes of funded projects, ensuring that investments align with sustainability principles. Furthermore, increased data transparency through digital systems enables banks to mitigate the risk of financing environmentally unfriendly projects (Andarsari and Febriansyah, 2020).

Although e-business offers numerous benefits in supporting Green Banking, challenges remain, including the need for robust technological infrastructure and educating customers about the importance of environmentally friendly digital banking services. Therefore, Islamic banks must continuously innovate their digital systems and raise public awareness of the benefits of Green Banking. With the right approach, e-business will not only enhance the efficiency of Islamic banking but also strengthen the banks' role in maintaining ecosystem balance and supporting sustainable development.

Digitalization in Islamic banking faces various challenges that must be addressed to ensure its effective implementation in accordance with Sharia principles. Key obstacles in this process

include regulatory aspects, technological infrastructure, and the level of digital literacy among customers. Islamic banks need to develop appropriate strategies to optimize the benefits of e-business without compromising Islamic financial principles and to maintain the sustainability of the Islamic banking industry in the digital era.

Challenges in the Digitalization of Islamic Banking:

- a. **Regulation and Sharia Compliance:** The digitalization of financial services must remain aligned with Sharia principles, necessitating clear regulations to ensure that digital products and services are halal and free from elements of *riba* (usury), *gharar* (uncertainty), and *maysir* (gambling).
- b. **Technological Infrastructure:** Not all regions, especially rural areas, have adequate access to technology. Limited infrastructure can hinder the adoption of digital services by Islamic banks and their customers.
- c. **Security and Data Protection:** As digital transactions increase, the risk of cyber threats such as hacking and personal data theft also rises. Islamic banks must ensure robust data protection to maintain customer trust.
- d. **Digital Literacy Among Customers:** Many customers, particularly elderly individuals or those unfamiliar with technology, face difficulties using Islamic banking digital services (Dz, 2018).

Solutions to Overcome Digitalization Challenges:

- a. **Enhancing Digital Financial Education Based on Sharia:** Islamic banks need to educate customers about the benefits and safe usage of digital services in accordance with Sharia principles through seminars, webinars, and digital literacy programs.
- b. **Collaboration with Sharia-based Fintech:** Partnerships with Sharia fintech companies can help expand the reach of digital services, foster product innovation, and accelerate the digital transformation of Islamic banking.
- c. **Strengthening Digital Sharia Policies and Regulations:** Governments and financial authorities should continuously update regulations to support the digitalization of Islamic banking, including the development of rules on Sharia-compliant smart contracts and blockchain technologies.
- d. **Investment in Security Technologies:** Implementing AI-based security systems, strong data encryption, and blockchain technology can enhance protection for digital transactions and uphold customer confidence in Islamic banking services.

By implementing these solutions, Islamic banks can overcome the challenges of digitalization and continue to develop as modern, efficient financial institutions that adhere to Sharia principles and environmental sustainability (Tambunan and Nasution, 2023).

## 5. Conclusions

Digital transformation in Islamic banking through the implementation of e-business has brought significant changes in bank operations, enhancing service efficiency and expanding financial access for the community. Digitalization enables Islamic banks to adopt technologies such as mobile banking, internet banking, and artificial intelligence, which not only improve customer convenience but also ensure compliance with Sharia principles. With more transparent and automated systems, Islamic banking services become more modern and competitive in the digital era.

Moreover, the utilization of e-business in Islamic banking also supports the principles of Green Banking. Digitalization helps reduce paper usage, optimize energy efficiency, and encourage environmentally-based investment and financing. Through technology-based banking systems, Islamic banks can conduct operations in a more environmentally friendly manner and support sustainable economic development in accordance with Islamic values.

Despite its many benefits, digitalization in Islamic banking still faces various challenges, such as regulations that must align with Sharia principles, technological infrastructure limitations, and low digital literacy among customers. However, these challenges can be overcome through enhanced Sharia-based financial education, collaboration with Sharia fintech, and

strengthened digital policies and security. With the right strategies, Islamic banks can continue to grow within the digital ecosystem without compromising Sharia principles and environmental sustainability.

To optimize the digitalization of Islamic banking, Islamic banks need to increase investment in technology development and robust digital security systems to protect customer data. The government and relevant authorities must also strengthen regulations that support digital innovation in Islamic banking without compromising Sharia principles and environmental sustainability. Through synergy among banks, regulators, and the community, the digitalization of Islamic banking can progress more rapidly and deliver broader benefits to the economy and the environment.

## References

- [1] Akil, M. A. (2015). Penerapan sistem informasi e-business di Indonesia: prospek dan tantangan. *Jurnal Dakwah Tabligh*, 16(2), 111-122.
- [2] Andarsari, P. R., & Firdiansyah, Y. (2020). Penerapan praktik green banking pada bank BUMN di Indonesia. *Jurnal Eksekutif*, 17(2).
- [3] Ardianto, R., Ramdhani, R. F., Dewi, L. O. A., Prabowo, A., Saputri, Y. W., Lestari, A. S., & Hadi, N. (2024). Transformasi digital dan antisipasi perubahan ekonomi global dalam dunia perbankan. *MARAS: Jurnal Penelitian Multidisiplin*, 2(1), 80-88.
- [4] Aripin, N. T., Fatwa, N., & Hannase, M. (2022). Layanan digital bank syariah sebagai faktor pendorong indeks literasi dan inklusi keuangan syariah. *Syarikat: Jurnal Rumpun Ekonomi Syariah*, 5(1), 29-45.
- [5] Cindi, C. N. S., Fasa, M. I. F. M. I., Suharto, S., & Fachri, A. F. A. (2022). Analisis implementasi e-business dalam mewujudkan green banking di perbankan syariah yang berkelanjutan. *SAUJANA: Jurnal Perbankan Syariah dan Ekonomi Syariah*, 4(1), 21-40.
- [6] Dz, A. S. (2018). Inklusi keuangan perbankan syariah berbasis digital-banking: Optimalisasi dan tantangan. *Al-Amwal: Jurnal Ekonomi dan Perbankan Syaria'ah*, 10(1), 63-80.
- [7] Fajri, A. M., & Violita, E. S. (2023). Analisis manajemen risiko bank syariah dalam melakukan transformasi digital (studi kasus pada Bank AS). *Owner: Riset dan Jurnal Akuntansi*, 7(2), 1249-1258.
- [8] Fathoni, A. (2006). *Metodelogi penelitian*. Jakarta: Rineka Cipta.
- [9] Husna, F. (2020). Wajah ekonomi 4.0: Perbankan syariah digital, peningkatan daya saing dan strategi dakwah Islam. *Idarotuna*, 3(1), 59-70.
- [10] Maradona, D., Rianto, S. Y. Y., Alma, W. J., Noeman, M. K. N., & Sudradjat, W. P. S. (2024). Sejarah peran teknologi dalam perkembangan ekonomi syariah: Inovasi, implementasi, dan implikasinya. *Journal of Social and Economics Research*, 6(2), 1033-1044.
- [11] Mawarni, R. (2021). Penerapan digital banking bank syariah sebagai upaya customer retention pada masa Covid-19. *Al Iqtishod: Jurnal Pemikiran dan Penelitian Ekonomi Islam*, 9(2), 39-54.
- [12] Mulyana, I., Hamid, A., & Syaripudin, E. I. (2024). Tantangan dan peluang penggunaan fintech dalam perbankan syariah. *Jurnal Hukum Ekonomi Syariah (JHESY)*, 2(2), 60- 69.
- [13] Qothrunnada, N. A., Iswanto, J., Hendratri, B. G., & Subekan, S. (2023). Transformasi digital lembaga keuangan syariah: Peluang dan implementasinya di era industri 4.0. *Indonesian Journal of Humanities and Social Sciences*, 4(3), 741-756.
- [14] Ria, D., Fasa, M. I., Suharto, S., & Fachri, A. (2023). Penerapan green banking di lingkungan Bank Muamalat Indonesia. *Jihbiz: Global Journal of Islamic Banking and Finance*, 5(1), 1-22.
- [15] Ruslang, R., Kara, M., & Wahab, A. (2020). Etika bisnis e-commerce Shopee berdasarkan maqashid syariah dalam mewujudkan keberlangsungan bisnis. *Jurnal Ilmiah Ekonomi Islam*, 6(3), 665-674.
- [16] Shabri, H., Azlina, N., & Said, M. (2022). Transformasi digital industri perbankan syariah Indonesia. *El-Kahfi: Journal of Islamic Economics*, 3(2).
- [17] Syafitri, A., & Nasution, M. I. P. (2023). Kemampuan perbankan syariah dalam mengoptimalkan eksistensi pada era digital 4.0. *MES Management Journal*, 2(2), 176- 182.
- [18] Tambunan, R. T., & Nasution, M. I. P. (2023). Tantangan dan strategi perbankan dalam menghadapi perkembangan transformasi digitalisasi di era 4.0. *Sci-Tech Journal*, 2(2), 148-156.
- [19] Tartila, M. (2022). Strategi industri perbankan syariah dalam menghadapi era digital. *Jurnal Ilmiah Ekonomi Islam*, 8(3), 3310-3316.
- [20] Winasis, S., & Riyanto, S. (2020). Transformasi digital di industri perbankan Indonesia: Impak pada stres kerja karyawan. *IQTI-SHADIA: Jurnal Ekonomi & Perbankan Syariah*, 7(1), 55-64.