

Digital Maturity and Artificial Intelligence in Islamic Banks and Their Role in Enhancing Digital Financial Inclusion: A Study of Al Rajhi Bank's Experience

النضج الرقمي والذكاء الاصطناعي في المصارف الإسلامية ودوره في تعزيز الشمول المالي الرقمي: قراءة في تجربة مجموعة مصرف الراجحي

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Abstract:

The banking industry has undergone a fundamental transformation coinciding with the emergence of financial technology (Fintech). This has opened new horizons for banks to digitally transform their products, services, and operations. Islamic banks have not been immune to this evolution, experiencing a profound shift driven by the adoption of digital transformation strategies. The use of artificial intelligence (AI) has potential to reduce operational costs and enhance the performance and profitability of financial institutions. This underscores the urgent need for Islamic banking to innovate advanced digital services that meet customer expectations. This research aims to explore the dimensions of digital transformation and the various applications of artificial intelligence in Islamic banks, emphasizing their role in promoting digital financial inclusion. The study includes an analysis of the leading experience of Al Rajhi Bank in this field.

Keywords: Digital Maturity, Artificial Intelligence, Islamic Banks, Digital Financial Inclusion, Al Rajhi Bank.

JEL Classification Codes: O33; G21.

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1. Introduction :

Digital transformation facilitates access to credit and financial services, helping lift people out of extreme poverty. Financial inclusion provides opportunities for more individuals to establish their own projects and earn a steady income. With the technological advancements, digital transformation has become an inevitable necessity across all economic sectors, especially in finance. Financial technology (Fintech) has accelerated the pace of digital developments. According to the Global Findex database, 1.7 billion adults worldwide lack access to a bank account, and 3 billion are underserved. Reaching deprived populations requires innovative channels and digital products. Given the tremendous technological advancements of our era, including the Fourth Industrial Revolution technologies like algorithms, artificial intelligence, and machine learning, digital evolution is a crucial pillar for the future of the financial and banking sector. Customers increasingly prefer executing their banking transactions through electronic applications and smart solutions. In this context, both Artificial Intelligence (AI) and Financial Technology (Fintech) have the real potential to reshape the structure of traditional financial services, making them faster and more cost-effective.

Moreover, information and communication technology, represented by both artificial intelligence and big data, holds significant importance due to its impact on economic activities. It has grown and evolved to dominate all areas, becoming the foundation of all operations. Recognizing this, Islamic banks have adopted innovative and customer-centric digital transformation strategies to meet the requirements and expectations of customers in this digital age. This radical transformation, driven by digital growth and the adoption of digital transformation strategies, responds to the growing demand for innovative banking products among the youth.

1.1 Study problem:

The problem of this study can be formulated in the following main question:

To what extent do the digital transformation and artificial intelligence strategies in Islamic banks contribute to enhancing digital financial inclusion? What can be learned from the experience of Al Rajhi Bank?

The study will cover the following:

- The theoretical framework of digital financial inclusion.
 - Dimensions of digital transformation in Islamic banks.
 - Applications of Islamic financial technology and artificial intelligence in financial operations.
- An analysis of Al Rajhi Bank's experience.

1.2 Literary review:

- In the study by Votintseva et al., 2019, titled "*Russian Banking Digital Transformation Institutions: Assessments and Prospects*," the aim was to evaluate the capabilities of local banks in the digital transformation process. The study found that implementing digital transformation helps focus on services to assist in providing innovative services and investing in artificial intelligence technologies. Additionally, the study concluded that digital transformation has a positive impact on banking product markets, services, tools, and customer relationships. It emphasized that the development of modern banking innovations contributes to improving the efficiency of credit institutions and achieving greater digital access.

- In the 2017 study by Omarini titled "*The Digital Transformation in Banking and the Role of FinTechs in the New Financial Intermediation Scenario*," the objective was to understand digital transformation as one of the key changes in the banking industry. It highlighted a profound transformation in the banking system, and the study's results indicated that digital transformation has significantly altered how banks operate. It emphasized the need for banks to reshape their processes to effectively deal with modern technology in terms of product, service, and customer interactions.
- A study by Kshetri Nir on *the role of artificial intelligence in financial development in developing countries*, published in the Journal of Global Information Technology Management in 2021. The study aimed to understand the contribution of artificial intelligence in enhancing and activating digital financial inclusion by undertaking tasks and analyses that cannot be performed by humans. This leads to improving the efficiency of financial institutions and increasing the customer base.

1.3 Study Importance:

Islamic financial technology represents a breakthrough in the current era, with its significance lying in showcasing various applications in the financial industry to activate digital financial inclusion. It encourages banks to keep pace with it and facilitates the transition from the traditional economy to the digital economy while managing its associated risks.

1.4 Study Objectives:

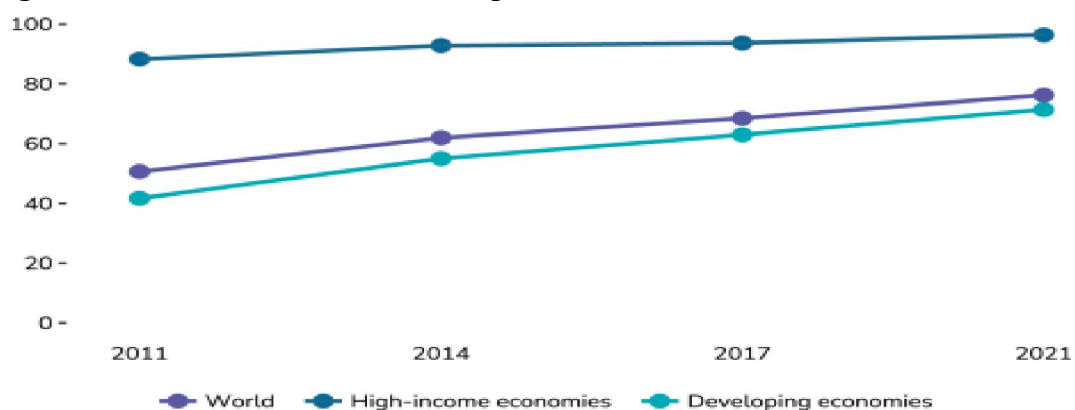
- Provide insights and concepts about digital transformation, digital maturity, and digital financial inclusion.
- Attempt to highlight various applications of Islamic financial technology to activate digital financial inclusion.
- Illustrate different experiences from countries, demonstrating how Islamic financial technology has played a significant role in promoting digital financial inclusion, with a focus on the leading experience of Al Rajhi Bank in this field.

2. The Theoretical Framework of Digital Financial Inclusion

2.1 Concepts about Financial Inclusion

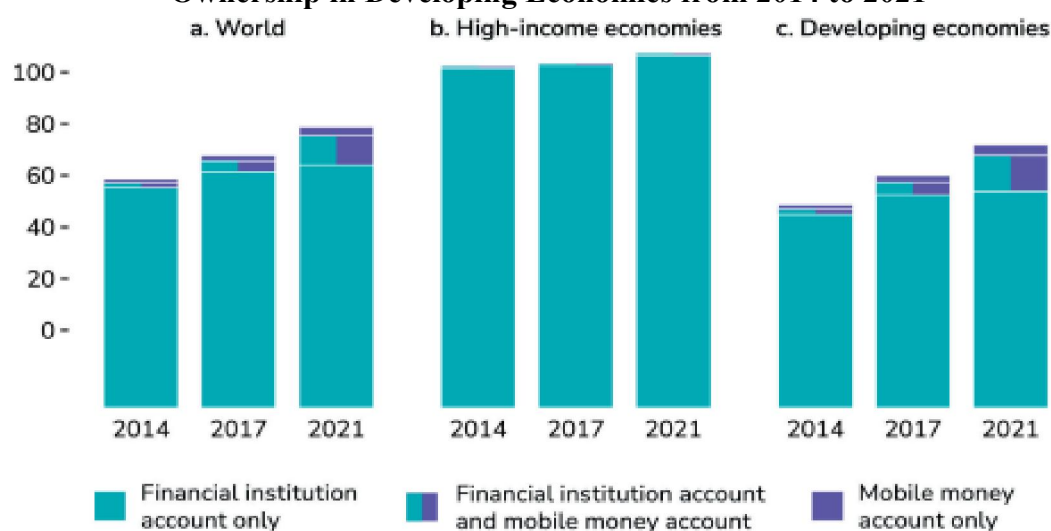
As of 2021, 76% of adults worldwide have an account with a bank or another financial institution, up from 68% in 2017.

Figure 01. Global Account Ownership from 51% to 76% between 2011 and 2021



Source: (World Bank, 2021)

Figure 02. Contribution of Mobile Money Accounts to the 8 Percentage Point Increase in Ownership in Developing Economies from 2014 to 2021



Source: (World Bank, 2021)

According to the World Bank's "Global Findex Database" report, approximately 1.7 billion people worldwide do not engage with banks. The report also noted that the majority of those who do not engage with banks reside in Muslim countries or regions, representing around 50% of the global population (World Bank, 2020).

It is the process of enhancing access to a wide range of formal financial services that are regulated, reasonably priced, and adequately structured, as defined by both the OECD and the International Network for Financial Education (Arab Banks Governors' Council, 2015).

Ensuring accessibility and access to financial products and services is essential for all segments of society, particularly vulnerable groups, and financial inclusion is governed by cost considerations (Zoheir Mohamed, 2019).

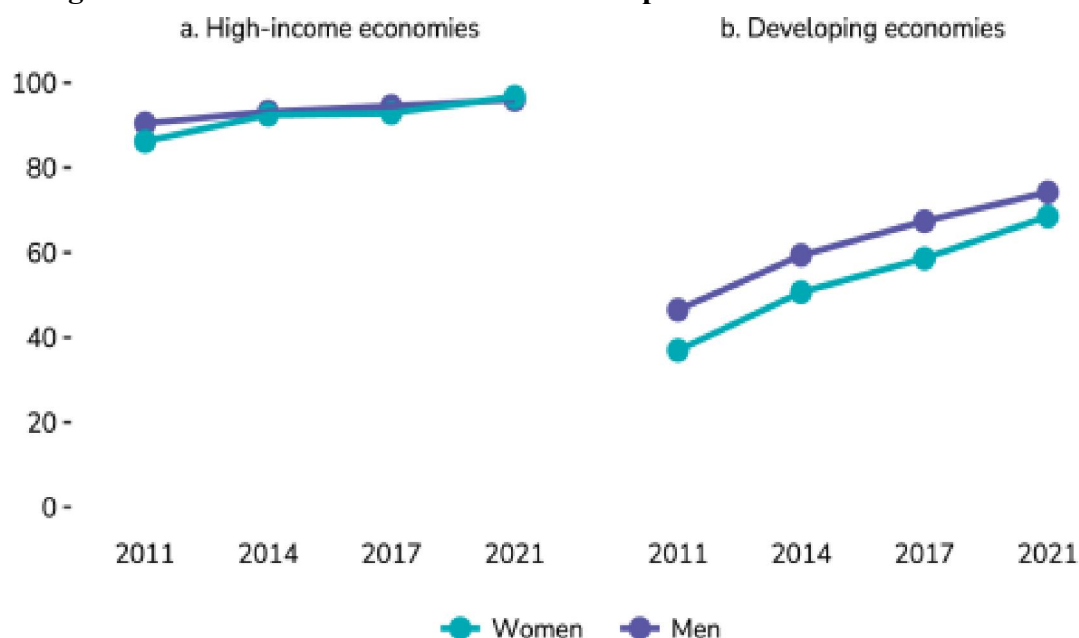
According to the International Monetary Fund (IMF), financial inclusion involves providing access to various financial products for different segments of society, including marginalized groups. This includes official channels such as banking and savings accounts, payment and transfer services, insurance services, and credit (Bank of Algeria, 2020).

It is the outcome of digital access to formal financial services and their utilization by those previously excluded or deprived. These services should be designed according to customer needs, as outlined by CGAP (CGAP, 2021).

2.2 The Reality of Digital Financial Inclusion in the Arab World and Globally

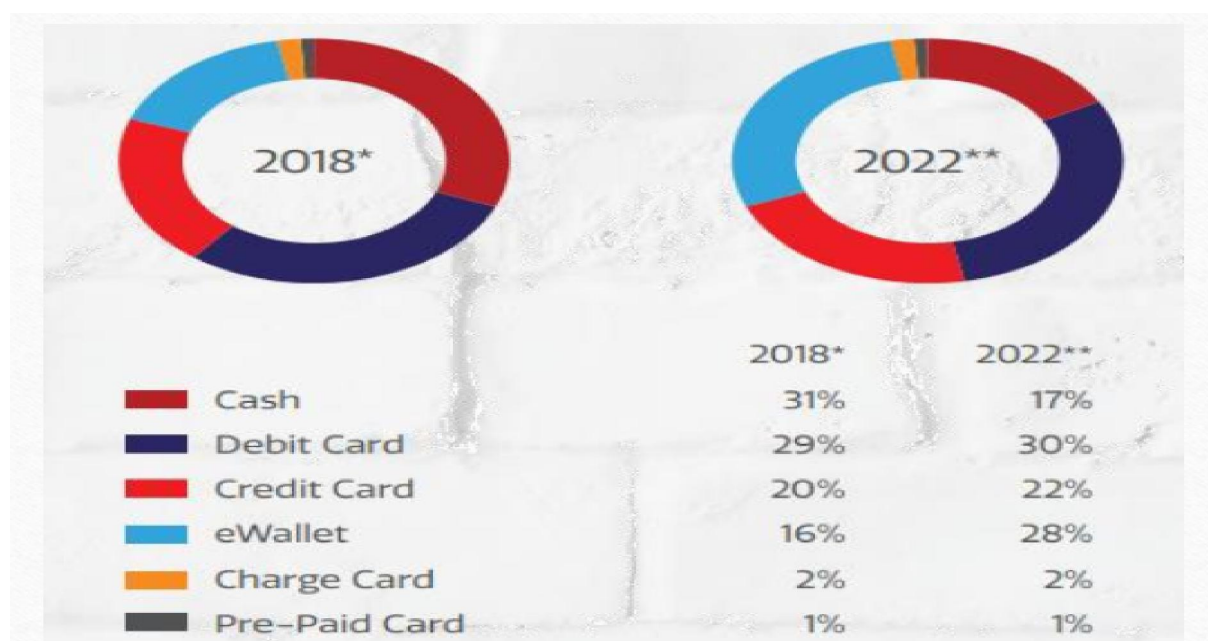
The COVID- pandemic has significantly impacted financial inclusion, leading to a substantial increase in digital payments amid the global expansion of formal financial services, according to the Global Findex Database 2021.

According to data from the World Bank, in Jordan, 47% of adults now own an account with a bank or another financial institution, or with a mobile money service provider due to the COVID-19 pandemic. This is an increase from 42% in 2017. The report also indicates that this figure has risen for women as well, reaching 34%. Moreover, 12% of adults in Jordan conducted digital payments in-store or online, including 8% who made their first digital payments to merchants during the pandemic.

Figure 03. Efforts to Narrow the Gender Gap Have Yielded Results Since 2017

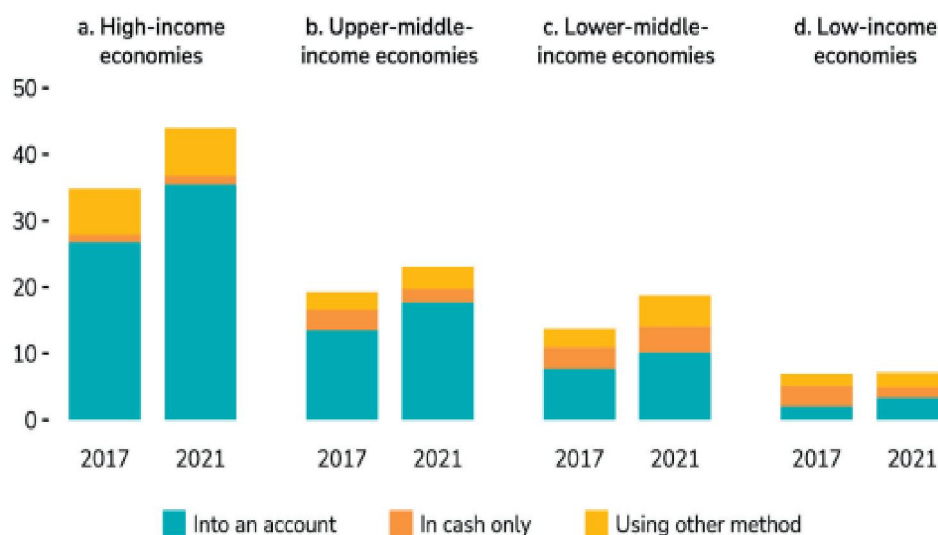
Source: (World Bank, 2021)

The report highlights progress in the Middle East and North Africa region in reducing the gender gap in account ownership from 17% in 2017 to 13% (World Bank, 2020). For the first time since the establishment of the Global Findex Database in 2011, the survey found a reduction in the gender gap in account ownership, providing women with more privacy, security, and control over their finances.

Figure 04. Estimates of Global Cash and Non-Cash Payment Usage 2018-2022

Source: (Fintech Insights, 2019)

Figure 05. Adults Receiving Government Transfers or Pension Payments in the Past Year (%), 2017 and 2021



Source: (World Bank, 2021)

3. Dimensions of Digital Transformation in Islamic Banks

3.1 Concept of Digital Transformation

Digital transformation is a complex aspect that organizations address to maintain their competitive position in the digital world (Fredrik, Lars, & Rikard, 2017, p. 352). In the context of banking operations, digital transformation is defined as a set of banking steps that begin with the issuance of a transfer order from the source to the payment destination. Subsequently, the transfer is made, and the beneficiary's bank accepts payment for the transfer (Sahib & Al-Khafaji, 2018, p. 167).

3.2 Mechanisms for Implementing Digital Transformation in the Banking Sector

These mechanisms can be detailed as follows:

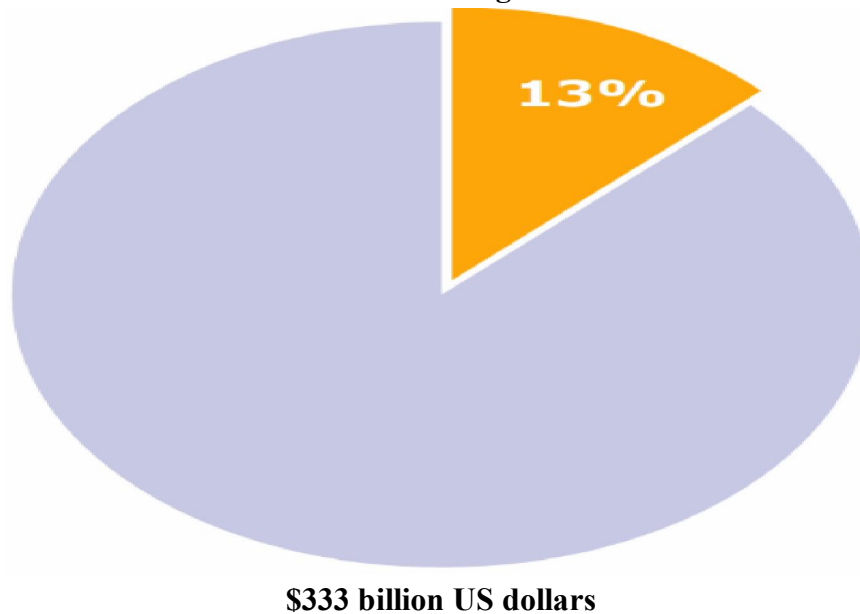
- **Processes:** These involve tasks that produce services for customers to ensure the optimal implementation of digital transformation. It includes alignment with the internal and external environment to accomplish these processes with a robust internal control system.
- **Data:** To provide reliable and complete qualitative information and procedures, institutions should make an effort to regularly and effectively manage and analyze data, developing suitable tools for data retrieval and future prediction.
- **Technologies:** Digital transformation requires the use of a system of devices, operating systems, storage means, and software working within technological environments and information centers that enable efficient asset utilization. It also requires ensuring an appropriate service level for employees and suppliers.
- **Human Resources:** Qualified personnel capable of using and analyzing data to make effective decisions should be provided. Building the institution's vision, planning, and implementing its plans require qualified human resources with scientific qualifications and practical experience to achieve change and development (Mustafa, 2019, p. 12).

3.3 Digital Maturity

For banks to reach a level of digital maturity, they need to fully adopt digital transformation. A cohesive digital strategy needs to be effectively communicated to all

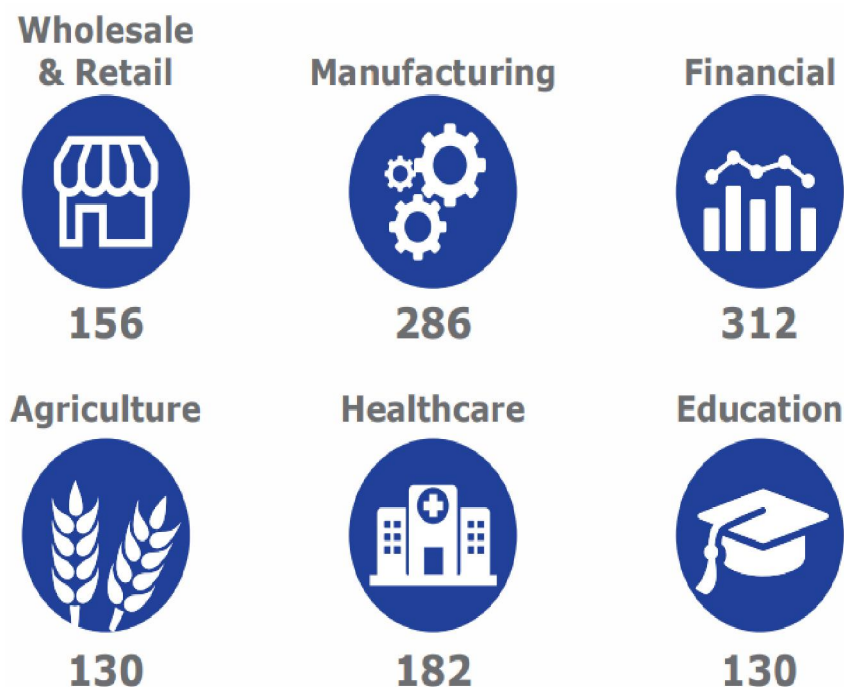
employees. Leadership should possess the skills and experience necessary to lead the digital strategy, digital transformation skills, a digital newcomer approach, rapid execution of digital technologies, and a customer-focused business model (Al-Haddad & Ibrahim, 2018).

Figure 06. Contribution of Digitization to GDP upon Achieving Full Digital Maturity for the Arab Region



Source: (League of Arab States, 2020, p. 90)

Figure 07. The digitization contribution on the six economic sectors in us dollars



Source: (League of Arab States, 2020, p. 90)

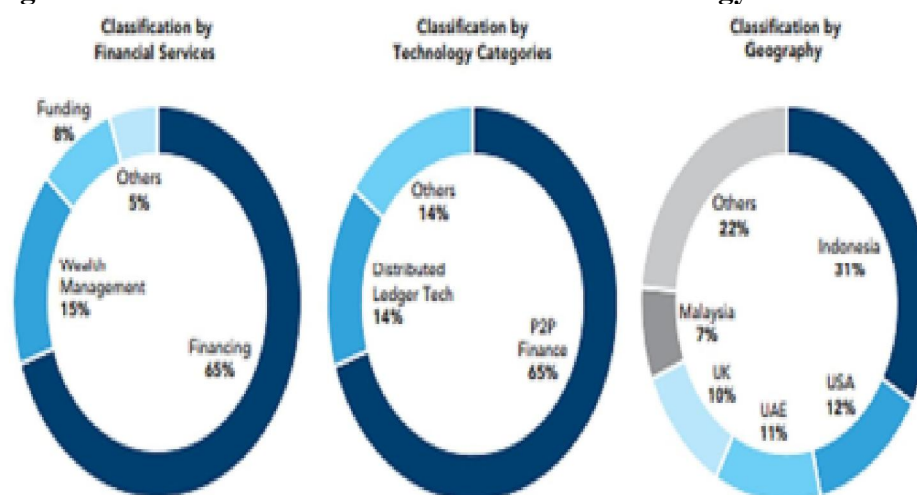
4. Applications of Islamic Financial Technology and Artificial Intelligence in Financial Operations

Islamic banks have embraced an innovative approach to confront the challenges and risks posed by FinTech companies and to retain customers. Digital transformation has become a necessity for Islamic banks as a key to prosperity, leadership, and innovation. Islamic FinTech, an additional feature associated with religion, can be attractive to populations and Islamic regions worldwide (Sofia, 2021).

4.1 Opportunities for Expansion in the Use of Islamic Financial Technology

There are approximately 93 Islamic companies in the FinTech sector, mainly focused on financing services. P2P financing is funded by 65% of these companies, followed by ledger technology. P2P platforms are the most common Islamic FinTech platforms due to their embodiment of Islamic finance principles.

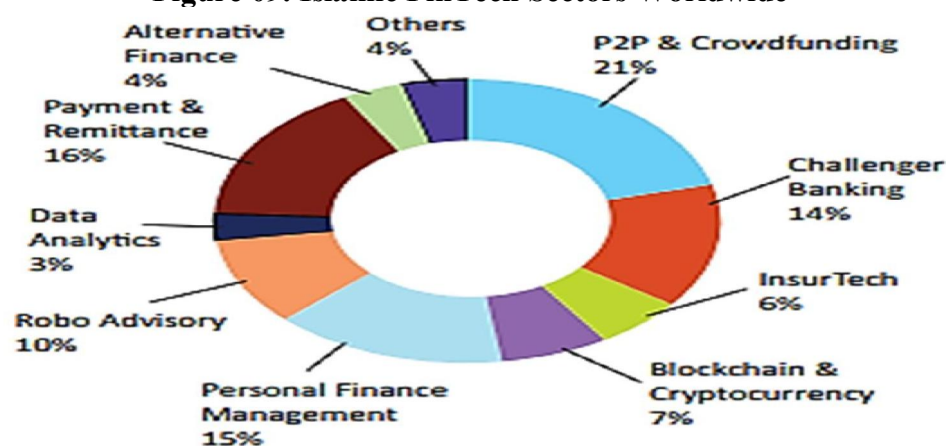
Figure 08. Distribution of Islamic Financial Technology Worldwide



Source: (World Bank, 2021)

The industry is expected to grow to over \$3.472 trillion by 2024, with a compound annual growth rate of 5.5% from 2018. P2P finance and crowdfunding are the fastest-growing segments in FinTech, especially with the presence of Islamic digital platforms.

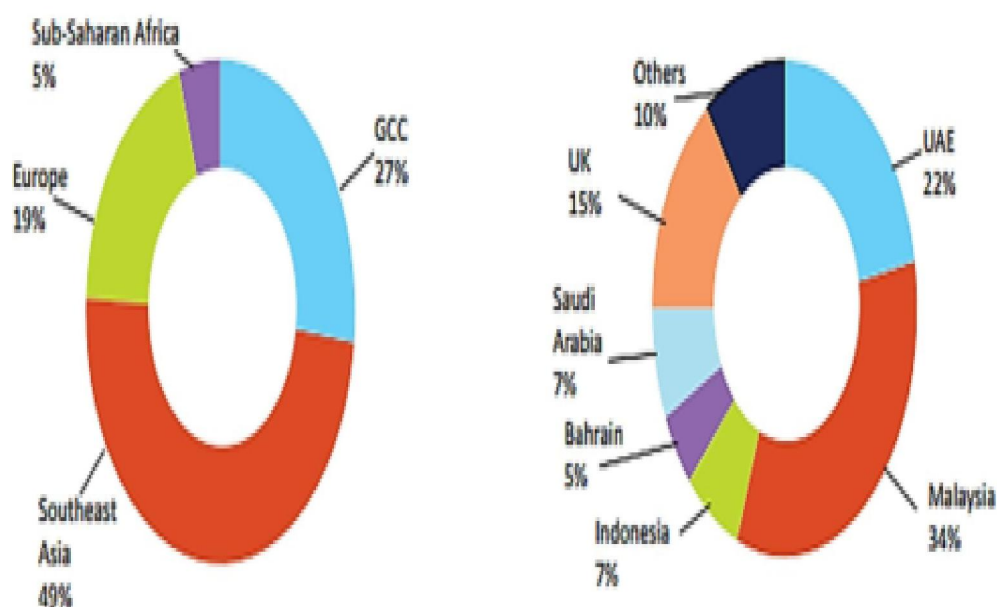
Figure 09. Islamic FinTech Sectors Worldwide



Source: (IFN Fintech, 2020, p. 12)

4.2 Distribution of the Use of Islamic Financial Technology Worldwide by Region

Southeast Asian countries lead in the utilization of Islamic FinTech at 49%, followed by GCC countries and Europe at 27% and 19%, respectively (IFN Fintech, 2020).

Figure 10. Distribution of Islamic Financial Technology Usage Worldwide by Region

Source: (IFN Fintech, 2020, p. 12)

4.3 Distribution of the Use of Islamic Financial Technology Worldwide by Country

Islamic countries have a significant share of tech-savvy young populations adopting digital technologies.

Table 01. Distribution of Islamic Technology Companies by Country - July 2020

Rank	Country	Number of Companies
1	United Kingdom	27
2	Malaysia	19
3	United Arab Emirates	15
4	Indonesia	13
5	Kingdom of Saudi Arabia	9
6	United States of America	9
7	Other countries	50
Total Global Islamic Technology Companies		142

Source: (CIBAFI, 2020)

4.4 Distribution of the Use of Islamic Financial Technology Worldwide by Main Sector

Islamic FinTech primarily relies on business and consumer financing and international money transfers, with 62 companies specializing in these areas.

Table 02. Distribution of Islamic Financial Technology Usage Worldwide by Main Sector

Field	Number of Companies	Field	Number of Companies
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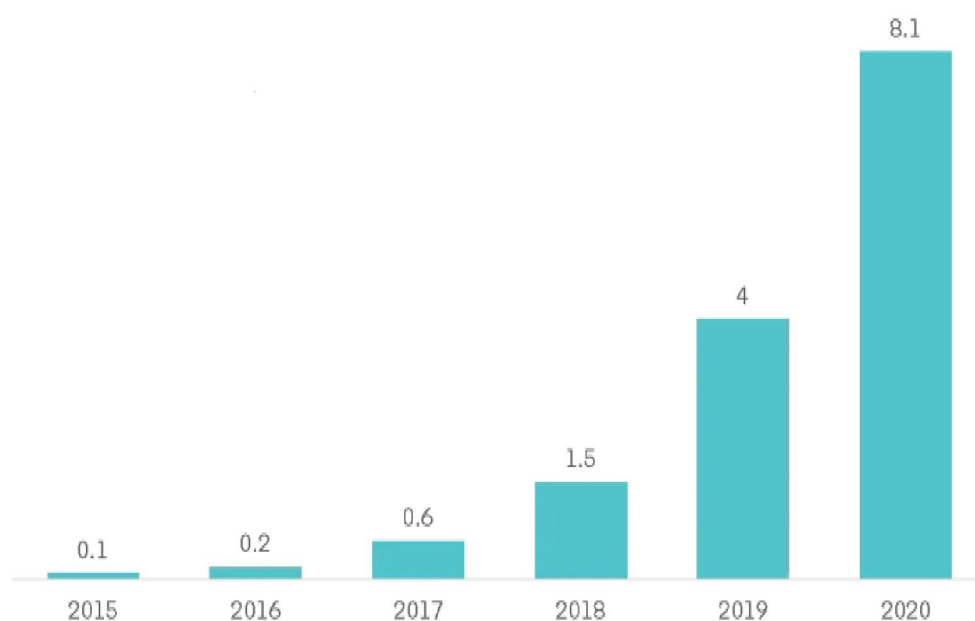
Blockchain and Cryptocurrencies	22	Alternative Financing	9
Payments, Money Transfer, and Forex	20	Personal Finance Management	7
Peer-to-Peer Financing	20	Cognitive Infrastructure for Islamic Economy	7
Trading and Investment	18	Data Analysis	6
Crowdfunding Platforms	17	Robo-Advisors	5
Competitive Digital Banks	10	Takaful Insurance Technology	2
Total Global Islamic Technology Companies		142	

Source: (IFN Fintech, 2020)

4.5 Expected Impact of Artificial Intelligence on the Banking Sector:

The banking sector is expected to benefit significantly from artificial intelligence (AI) systems, enabling the banking community to achieve savings exceeding \$1 trillion by 2030. The global AI market was valued at approximately \$7.91 billion in 2020 and is expected to reach \$26.67 billion by 2026, with an estimated compound annual growth rate of 23.17%.

Figure 11. Market Value of Assets Managed by Robo-Advisors 2015-2020 (Trillion USD)



Source: (Sofia, 2021)

Figure 12. Expected Economic Gains from Artificial Intelligence in Different Regions Worldwide for 2022



Source: (ITU, 2023)

5. Analysis of Al Rajhi Bank's Experience

Al Rajhi Bank's strategy for 2021 aims to build new capabilities for the bank, ensuring sustainable growth and contributing to the achievement of the Kingdom's Vision 2030 goals. The bank aspires to achieve these ambitions as a primary future goal through the execution of its strategic plan consisting of five main pillars: enhancing growth to excel over competitors, becoming the preferred destination for employment in the sector, increasing focus on customer needs, achieving digital leadership, and excelling in execution.

Table 03. Al Rajhi Bank Group's 2030 Strategy

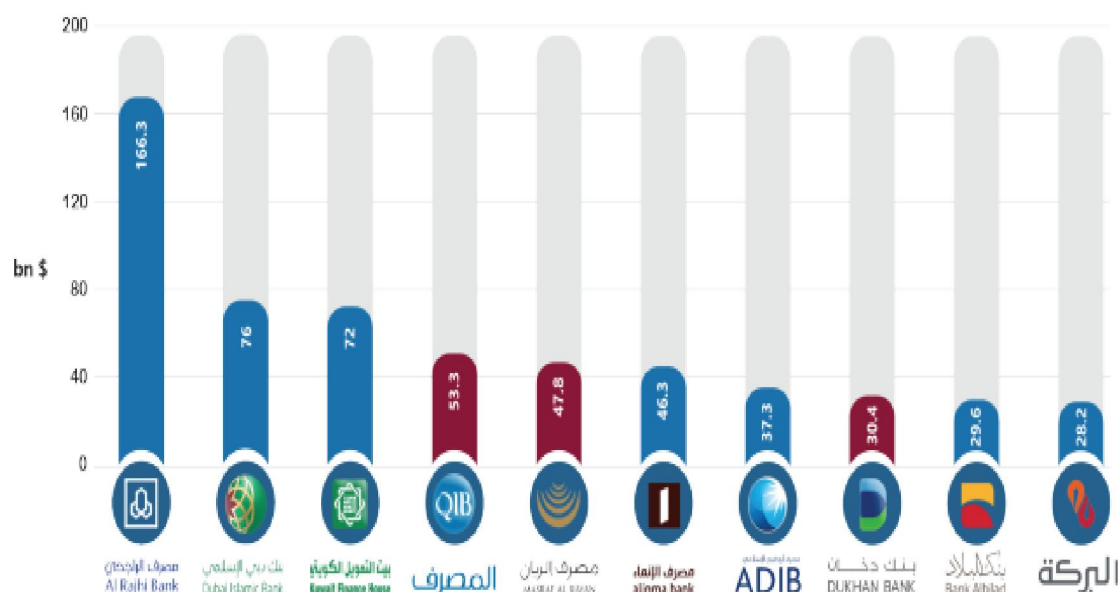
Digital Leadership	Smart Expansion in Channels and Service Delivery Methods	Digitizing Customer Journeys	Shifting Customers to Self-Service Channels	Innovation in Payments
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Source: Compiled by the researcher

5.1 Expansion of Al Rajhi Saudi Bank's Financial Strategy

The bank is currently planning to keep pace with the digital future and is working on building a banking entity that will become the preferred bank for digital customers in the future.

Figure 13. Ranking of Islamic Banks Worldwide by Asset Size for 2021 (Billion USD)



Source: Islamic Finance Report 2021, <https://b-mashura.com>

The bank has adopted a new strategy to address these specific challenges, as outlined in the following figure:

Figure 14. Al Rajhi's Strategy "Bank of the Future 2021-2023"



Source: (Al Rajhi Bank, 2021)

5.1.1 Activation of the New Financial Brokerage Platform "Al-Rawad"

Becoming the first brokerage company in the Kingdom, it works to enable public investment funds to operate online through electronic banking platforms. With other pioneering initiatives, qualified investors can now participate electronically in public subscription operations. Priority will be given in 2022 to a set of initiatives by providing automated consultations and updating the company's information structure.

5.1.2 Neolab Company and the Shift to Financial Technology

Neolab, the latest subsidiary of Al Rajhi Bank, has embarked on an ambitious entry into the Kingdom's digital financial solutions system. It aims to lead and shape the future of digital payments at the Kingdom level. The company obtained a license under its trade name "Global Digital Solutions Company" from the Saudi Central Bank. In its comprehensive strategy to achieve digital financial inclusion for individuals and companies, Neolab aims to enhance the emerging system of digital transactions in the Kingdom, contributing to the achievement of the digital transformation goals of Vision 2030. Neolab announced the launch of a range of innovative financial technology products, still under development, to be released in the near future (Al Rajhi Bank, 2021):

- **UrPay Digital Wallet:** Digital payment options for customers and partners, along with a marketplace for digital and physical products.
- **NeoGate Payment Gateway:** Credit card payments and Mada card payments in e-commerce for companies.
- **NeoStore Merchant Services:** Integrated solutions for companies to build an e-commerce store with multiple payment methods.
- **NeoECR Cashier Services:** Electronic cash register solutions for merchants in physical points of sale.
- **Digital Point of Sale (SoftPOS):** Digital point-of-sale service via phone.

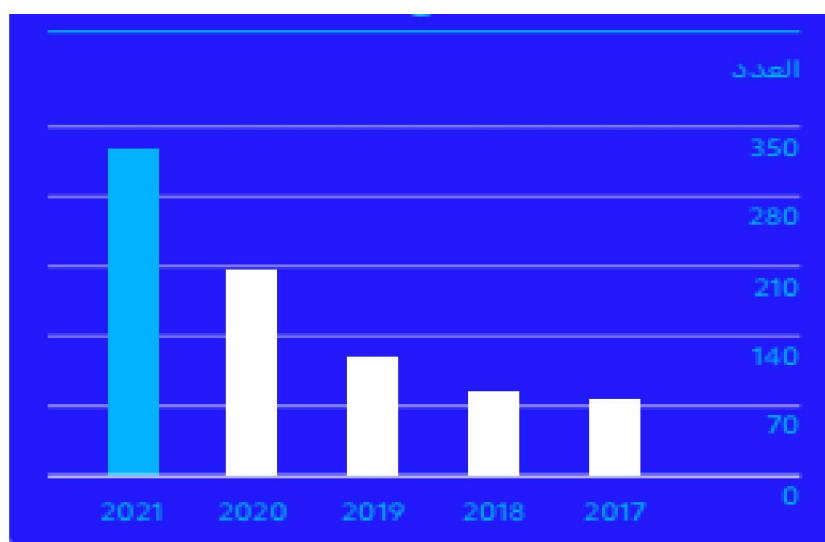
5.1.3 Iktan Finance Company "Comprehensive Digital Personal Financing Products Portfolio"

Al Rajhi Bank focused on the rapidly evolving Saudi financial market to identify new opportunities. In this context, the bank identified categories and segments of individuals not currently attracted, such as freelancers, non-salary-dependent segments, the private sector, and other sectors with credit needs. Thus, Iktan Finance Company was established to enhance financial inclusion, simplify financing procedures, and support Vision 2030's goal of developing a diverse and effective financial sector to contribute to national economic growth.

Iktan's operations began with its comprehensive digital personal financing product portfolio, relying on its digital functions aimed at enabling customers to know about financing products and apply for them through the smartphone application. The Iktan app was classified as the best microfinance app in the Kingdom in 2021, with over 1.2 million downloads and installations through iOS and Android stores. About 90% of the bank's transactions transitioned to digital by the fourth quarter of 2021. The bank achieved significant digitization by increasing mobile banking services by 60%, while traditional ATM transactions decreased by 20%.

Source: Al Rajhi Bank Annual Report 2021

Figure 15. Number of Point of Sale Stations in the Bank 2017-2021



Source: Compiled by the researcher

In line with the bank's goal of distinguishing itself by providing superior customer experiences and unique direct processing capabilities, the bank continued to invest in automation and digitization. The bank increased the number of transactions executed through robotic automation by 100% annually, with over a billion transactions in 2021. This was achieved by increasing automated processes by 30%, robots by 25%, and particularly enhancing individual operations automation to cover various stages of mortgage approval, positively impacting the customer experience.

The bank also worked on digitizing a range of financing products and services in 2021, including full execution tasks for the "My Nation" personal financing product. The bank introduced instant approval for personal financing and revolving credit cards, significantly enhancing the efficiency of electronic transactions. It also launched comprehensive real estate financing solutions for on-the-map sales and car financing solutions, including the Last Installment Financing product, available online (Al Rajhi Bank, 2021).

5.2 Introducing New Products and Services by Al Rajhi Bank Malaysia

Al Rajhi Bank Malaysia has launched several new products and services. These include the Home One H1A program for real estate financing, personal financing for civil servants through collaboration with equity contributors, and a profit-sharing current account in foreign currencies. After restructuring personal and real estate financing, successful digital service launches in 2021 resulted in increased usage of digital services by individual customers. Both campaigns led to record-breaking monthly sales, indicating the success of Al Rajhi Bank in Malaysia in shifting spending focus from traditional media channels to digital channels.

5.3 Al Rajhi Bank - Jordan

In Jordan, the bank introduced a set of innovative digital initiatives that increased efficiency, improved customer experience, and streamlined operations during the reporting year. These initiatives included improvements to the current customer relationship management system. With the continued expansion of its digital capabilities, the bank launched a campaign to transition to digital services, resulting in a 70% increase in registered customers for digital services out of the total customer base in Jordan.

5.4 Al Rajhi Bank - Kuwait

In Kuwait, Al Rajhi Bank enhanced its operational efficiency by strengthening existing electronic channels, issuing credit and debit cards, and implementing a unified system for preparing reports for retail and core operational activities. In alignment with the enhanced and digital services provided by the Public Authority for Civil Information in Kuwait, the bank entered into a cooperation agreement to install two self-service devices, enabling customers to register, create digital signatures, verify electronic identities, and authenticate online banking transfers.

The bank continued its digital transformation journey in Kuwait in 2021, implementing a range of initiatives, including improving features of electronic channels, introducing facial recognition technology for identity verification, and digitizing business requirements. The comprehensive goal is to provide customers with integrated solutions for digital banking services. Additionally, the bank enabled customers to view electronic statements for credit cards and initiate instant transfers from Kuwait to Saudi Arabia. New ATMs were introduced in Al Rajhi Bank branches in Kuwait, along with a significantly enhanced version of the official Al Rajhi website in Kuwait (Al Rajhi Bank, 2021).

6. Conclusion

The recent advancements in Islamic financial technology have triggered a significant revolution in the modern era. Particularly, as most data requires artificial intelligence and the use of applications, AI has become a savior for institutions. It simulates human minds in service delivery, making its use prevalent. Consequently, there are numerous benefits and challenges facing artificial intelligence, with many success stories proving its importance, especially in the context of the digital maturity of banks providing digital financial products to achieve higher levels of digital financial inclusion.

The study has yielded the following results:

- Adopting financial technology in institutions contributes to reducing operational costs, supporting competitiveness, and achieving digital financial inclusion.
- Islamic financial tools have been found to be an alternative to traditional interest-based financial tools. However, to cover all aspects of financing in the national economy, they must go beyond offering alternatives. There should be an initiative to innovate and develop their existing strategies because expanding into more global banking markets requires it.
- Financial technology is a suitable tool for finding innovative solutions and new financial instruments that combine Sharia controls with economic efficiency considerations.
- The necessity to increase spending on financial technology to enhance banking services for customers, particularly through various electronic technologies.
- The importance of training various employees on the mechanisms and technologies of financial technology and artificial intelligence, given their role in diversifying economic activities.
- The significance of encouraging banks to keep up with financial technology and the transition of financial sectors from traditional to digital economies, simultaneously managing the risks and implications of this transformation. The experience of Al Rajhi Bank, a pioneer in this field, serves as a notable example.

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