Financial Technology Efforts in the Development of Islamic Banking Industry: The Malaysian Experience as a Model

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Abstract:

Islamic banks serve as a strategic choice for a specific segment of investors looking to engage in Islamic financial transactions. In this context, this paper aims to highlight the contributions of financial technology in introducing financial innovations that drive the Islamic financial sector in Malaysia, as a model for keeping pace with global banking system developments. This research paper addresses three key aspects. The first aspect provides an overview of the theoretical foundations of financial technology. The second aspect discusses the reality of Islamic banks adopting financial technology. The third aspect focuses on presenting Malaysia's experience in utilizing financial technology applications for the development of the Islamic banking industry. The study results indicate a significant inclination of Islamic banking in Malaysia towards adopting financial technology applications in compliance with Islamic Sharia principles, such as crowdfunding platforms, cryptocurrencies, regulatory environments, artificial intelligence systems, and smart sukuk.

Keywords: Financial Technology, Financial Innovation, Islamic Banking, Malaysia.

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Introduction

There is no doubt that the world is currently experiencing a scientific revolution at an astonishing pace, which has significantly altered the traditional landscape of finance. Many transactions have swiftly shifted towards technological innovations, which have become a global trend for both advanced and developing economies. Over the past few years, the financial technology sector, often abbreviated as "Fintech," has revolutionized the financial services industry. Despite the potential threats that this transformation poses to banks and financial institutions, it has become an important gateway for a wide range of consumers and financial service seekers due to the speed and efficiency of financial transactions.

In this context, financial technology applications have expanded to include the Islamic banking industry, which has proven its position in the global financial markets with competitive banking shares. As Islamic banks continue to spread and evolve their services, the focus on modern

financial technologies and technological innovations has become one of the most important pillars for enhancing the performance and competitiveness of these banks. To achieve this goal, many Islamic banks in various countries, such as the Gulf states and Malaysia, have hastened to adopt this technology with the hope of developing and designing products and services that align with their customers' needs.

The period from 2000 to 2020 witnessed the successful use of Sharia-compliant financial technology applications, such as the launch of digital Islamic Fintech platforms around the mid-2000s by Islamic FINTECH, in collaboration with payment service providers like MasterCard, Visa, and American Express, to facilitate transactions. They also collaborated with traditional banks to establish virtual Islamic branches. Additionally, Beehive, the first independently Sharia-compliant peer-to-peer finance platform, was founded in the United Arab Emirates in 2014. It managed to provide approximately 25 million UAE dirhams, or around 7 million US dollars, to more than 50 small and medium-sized companies in its first year. Moreover, the innovative Islamic finance profit-sharing platform was launched via NASDAQ Dubai in April 2014, achieving transactions exceeding 21 billion UAE dirhams by the end of 2014.

Malaysia has also been quick to capitalize on this technology as a leading country in Islamic finance, keeping up with technological advancements in the financial sector and the financial innovations it witnesses to achieve prosperity and growth. Malaysia has achieved this through the enactment of laws and policies and the provision of suitable infrastructure. One of its most notable achievements in this regard is the establishment of the Investment Account Platform (IAP), which is considered the first internet-based platform with Islamic banking features that brings together banking experts and competent technicians. The platform's purpose is to channel investor funds into vital economic projects.

Study problem:

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

What is the importance of adopting financial technology applications in promoting the Islamic banking industry in Malaysia?

The following sub-questions fall under this problem:

- What is meant by financial technology, and who are the major financial technology companies?
- How have Islamic banks benefited from financial technology applications?
- How does financial technology contribute to the development of the Islamic banking industry in Malaysia?

Study Hypothesis:

This study proceeds from the following main hypotheses:

The application of financial technology in the Islamic banking industry in Malaysia may lead to the promotion of its Islamic banking products and the creation of new financial innovations that allow it to gain competitive positions in the market.

Study objectives:

Our study aims to highlight the significance of financial technology in the development of the Islamic banking industry by presenting the Malaysian experience as a pioneering model in this field. It seeks to demonstrate how the Islamic banking industry can leverage financial technology innovations to enhance its services and products while addressing the challenges that may impede its optimal utilization. Additionally, the study aims to identify key innovations and achievements in financial technology and how Islamic banks are adapting to the digitization era and harnessing services offered by global Islamic fintech companies.

Study importance:

The significance of this study lies in its exploration of a relatively recent topic in the field of finance: how the Islamic banking industry in developing countries, particularly in Malaysia, can adapt to and benefit from the latest financial technological developments and innovations. The study also delves into how these technological advancements can help develop Islamic financial products and services, ensuring competitiveness and improved performance. The future of the Islamic banking industry depends on its readiness to embrace digitization and utilize the services provided by global Islamic financial technology companies in an increasingly competitive environment.

Study Approach and Structure:

To address the main research problem, we have adopted a descriptive and analytical methodology. This approach allows us to explore various concepts and explain their relationships across the different research axes, which we have divided into three primary axes. The first axis focuses on the theoretical foundation of financial technology. The second axis addresses the practical adoption of financial technology by Islamic banks, while the third axis concentrates on presenting the Malaysian experience in utilizing financial technology applications for the development of the Islamic banking industry.

I. The Theoretical Foundation of Financial Technology

Since the financial system is a part of the economic and social system, it is expected to evolve in accordance with the patterns of both and to align with the outcomes of the economic and social systems. An example of this is that the emergence and flourishing of insurance coincided with the boom in international trade and the appearance of numerous financial innovations that

accompanied the Third Industrial Revolution, often referred to as the Digital Revolution. Therefore, it is not surprising that financial technology (FinTech) is keeping pace with the Fourth Industrial Revolution (the Technological Revolution). The first wave of technology companies emerged around the end of the second millennium and the beginning of the third, and it was then known as the Information Technology Revolution or the Dot-com era.

1. Definition of Financial Technology (FinTech)

Financial technology (FinTech) consists of two words: "technology" and "finance." In its broadest sense, it refers to the application of technology in the financial industry and covers a wide range of financial services such as lending, investment, payments, risk management, data analysis, insurance, and wealth management. More precisely, financial technology means the innovative use of technology in designing and delivering financial services and products, which implies that aspects of financial technology involve using technology to efficiently and effectively carry out financial transactions, including payments, transfers, lending, insurance, securities, and all imaginable financial transactions (Boumoud, 2020).

According to the Financial Stability Board, financial technology is financial innovation through technology that can create new business models, applications, processes, or products that have a tangible impact on markets and financial institutions, and on the provision of financial services(Valley, 2020).

As the terminological meaning of financial technology is relatively recent, it seeks to compete with traditional financial methods when offering various financial services. Examples of financial technology are numerous, ranging from using smartphones for banking operations (such as transfers, withdrawals, or payments) to trading and investment operations, digital currencies, and crowdfunding platforms (Ashater, 2019).

In summary, financial technology can be defined as a set of modern techniques in the financial sector that provide innovative financial services and products targeting capital markets and financial institutions worldwide. Its goal is to enhance financial stability for countries, support economic and social development.

2. The Importance of Financial Technology

There is no doubt that highlighting the importance of financial technology and its impact on the financial sector or the real economy cannot be covered by isolated research. However, the most significant achievement of financial technology is its support for business models and financial products and services that were previously unattainable. The financial sector has undergone a clear transformation since the introduction of financial technology. Financial technology has played a considerable role in enhancing market efficiency, improving the customer and consumer experience, and providing financial services and technological solutions that are better, more

cost-effective, and faster to implement. This expansion has led to increased financial inclusion through improved products, services, and solutions reaching individuals and groups previously outside the financial sector.

Additionally, the use of financial technology allows for the reduction of risks, especially those associated with uncertainty, and linked to contracts, which were closely associated with it. Through distributed ledger technologies, whether centralized or decentralized, risks such as non-disclosure, lack of transparency, or counterparty risk can be reduced. Conversely, smart contracts contribute to reducing legal risks, while regulatory technology (RegTech) plays a role in reducing compliance risks. Artificial intelligence and big data analytics also enhance security, improve customer experience, and reduce costs (Thakor, 2020).

3. Financial Technology Companies

The most important types of financial technology companies include:

3.1 Startups

These are innovative projects, often in the form of venture capital companies, with significant and successful growth potential. However, they are exposed to high risks, as they either achieve remarkable success or fail miserably. Startups may advance to the next stage to become a "Unicorn," a term used for startups that surpass a billion-dollar valuation. Startups are a source of inspiration and are a significant driving force behind financial technology, particularly with the current global trend of regulatory authorities supporting these companies. Regulatory bodies and institutions, such as the Bahrain FinTech Bay, Fintech Saudi, and Abu Dhabi's Hub 71, have established technology accelerators, which are programs aimed at providing supportive environments, funding, and resources for fintech innovation through creating experimental labs (Sandbox) and other facilities.

3.2 Unicorns

The term "Unicorns" was first coined in 2013 by a businesswoman named Aileen Lee. It refers to private startups that are valued at over one billion dollars and are considered rare. These companies are characterized by rapid growth achieved over a short period, reliance on modern technology, and adaptation to the changes in communication and information sharing. These startups may overcome the early challenges, with the failure rate for this type of company exceeding 90%. If they achieve significant success, they can become "Unicorns." If they specialize in financial technology, they may be referred to as "BigTech."

3.3 Big Tech Companies

While the primary business of these tech giants is not in the financial sector, they have entered the financial investment industry. They have developed their own payment and transfer

platforms, and they compete with even the largest financial institutions. Examples of these tech giants include Apple, Google, and Facebook. They aim to enhance the utilization of financial services offered by existing financial companies or, in some cases, replace them. Big Tech companies have become significant providers of financial technology (FinTech) and pose a real threat to traditional financial institutions. Over time, the term "Big Tech" has been used to refer to large technology companies such as Google, Facebook, Amazon, Apple, Samsung, Microsoft, while smaller technology companies are referred to as "FinTechs." As explained earlier, financial technology companies can be startups with limited capital and high risks, which may grow to reach substantial sizes, but they don't reach the scale of Big Tech companies, and these startups are referred to as "Unicorns" in this context.

4. Prominent Uses of Financial Technology

The uses of financial technology have diversified within the banking sector, depending on the specific needs. We find:

4.1 Artificial Intelligence (AI)

AI refers to the machine's ability to perform cognitive functions typically associated with human minds, such as perception, reasoning, learning, problem-solving, and even creativity(EBF, 2019, p. 04). AI relies on computer hardware and algorithms to simulate human-like intelligence(Chan, Chow, Wong, & Dimakis, 2019, p. 06), which is used in banking operations to automate processes, reduce error margins, and predict insolvency.

4.2 Big Data

Big Data involves the use of technologies that provide users with timely access to accurate information from rapidly growing datasets. Big Data allows banks to gain deep insights into customer spending habits, simplifying their needs and preferences through the ability to track all customer transactions(Mauricio, 2016).

4.3 Blockchain Technology

Blockchain represents the foundation for many successful financial technology innovations, such as smart contracts, cryptocurrency systems, and more. Blockchain is a distributed ledger technology that provides transparency, data security, and efficient transaction processing, ultimately reducing uncertainty and risks in transactions(Mulligan, 2018).

4.4 Smart Contracts

Smart contracts are self-executing, code-based software programs used in blockchain technology to transfer digital currencies among multiple parties under specified conditions(Al-Haniti & Hilal, 2019, p. 48).

4.5 Cloud Computing

Cloud computing involves using shared computer resources accessible over the Internet. Banks can move their technology to the cloud, adapt to market changes, and provide new ways to meet customer expectations(Lakshmi & Jansi Rani, 2018).

4.6 Digital and Cryptocurrency

Digital currencies include digital representations of value in a specific unit of account, whereas cryptocurrencies represent a type of digital or virtual currency, such as Bitcoin and Ethereum (Central Bank of Jordan, 2020).

4.7 Cybersecurity

The emergence of financial technology has increased the need for more security in financial operations, emphasizing the importance of cyber resilience and protection of assets(International Telecommunication Union, 2010).

5. Regulatory Authorities and the Fintech Dilemma

Regulatory authorities are facing a real dilemma in light of the tremendous spread of financial technology. On one hand, they encourage innovations through experimental labs while trying to maintain financial stability, transparency, and investor protection. If we consider the terms innovation and development, they represent some of the most advanced forms of progress that the financial industry has seen so far. Innovation inherently implies change and sometimes the disruption of what is conventionally known or what can be called "traditional." This change can be quite daunting for regulatory authorities as it is often seen as a potential source of instability. Governments' reactions to fintech have not been uniform, with some countries taking very cautious stances. This, in turn, led regulatory authorities to adopt negative positions towards many of these technologies, including banning digital currencies, prohibiting crowdfunding platforms, and not recognizing smart contracts, among other actions. In contrast, other countries rushed to adopt these technologies and provided them with all necessary facilitations to encourage their widespread use. This resulted in the emergence of numerous financial centers such as Luxembourg, China, the United Arab Emirates, Bahrain, Saudi Arabia, Malaysia, and Indonesia.

6. Global Fintech Hubs

Most vital developments and successes in financial technology are concentrated in specific geographic ecosystems known as fintech hubs. These hubs are where innovators, investors, and organizers can interact, build networks for collaboration, and learn from one another. These

centers are often named after the cities where they are located. The table below presents the top 30 international fintech hubs:

Table 01: Top 30 International Fintech Hubs

	FinancialTechnology Center	Country	GeneralClassification	FintechIndustry Classification	ConsumerFintech Experience Classification	FintechEcosystem Classification
Regional Fintech Themes	Beijing	China	1	1	4	4
	San Francisco	USA	2	2	10	2
	New York	USA	3	3	11	1
	London	United Kingdom	4	4	8	3
	Shanghai	China	5	5	5	14
	Hangzhou	China	6	7	1	16
	Shenzhen	China	7	6	2	17
	Chicago	USA	8	8	24	12
	Singapore	Singapore	9	11	29	6
	Hong Kong	China	10	10	17	13
	Sydney	Australia	11	9	14	18
	Seattle	USA	14	17	18	11
	Tokyo	Japan	13	14	30	9
	Boston	USA	14	17	18	11
	Paris	France	15	22	25	5
	Guangzhou	China	16	25	3	26
	Stockholm	Sweden	17	15	27	10

Atlanta	USA	18	13	19	22
Los Angeles	USA	19	24	15	8
Seoul	South Korea	20	23	20	15
Tel Aviv	Israel	21	19	21	21
Berlin	Germany	22	12	16	29
Toronto	Canada	23	18	23	20
Nanjing	China	24	28	6	24
Bangalore	India	26	26	7	25
Mumbai	India	26	26	7	25
Sao Paulo	Brazil	27	21	12	30
Zurich	Switzerland	29	29	22	19

Source:(Kuzmanova, 2020, pp. 25-26)

From the table above, it is evident that China, particularly in the field of payments, has widely embraced financial technology. China has made significant strides with the presence of major companies offering fintech services such as "Alipay" and "Ant Financial." The United States follows, possessing expertise in the financial field and government support. Singapore is a mature fintech market that emphasizes innovation, asset management, robotics, finance, and incentives. Hong Kong also experiences substantial investment inflow, and, with its access to the Chinese market, is witnessing significant growth in financial technology, ranking among the top ten cities in the world for fintech overall.

Regarding the fintech ecosystem, the United States, particularly New York and Chicago, holds the top position globally. It stands out for its regulatory technology adoption and a massive number of companies developing fintech services, especially in Silicon Valley, San Francisco, home to major global corporations like "Apple" and "Google." London follows, and then Beijing. In the global fintech ranking, China holds the first position, followed by the United States and the United Kingdom. Each country focuses on specific fintech technologies. The

United States has recently focused on regulatory technology to better comply with regulatory rules(Zahraa & Huweiba, 2019, pp. 329-328).

II. The Reality of Islamic Banks' Adoption of Financial Technology

Islamic banks around the world have realized the necessity of advancing their financial transactions by embracing financial and digital technology. This realization became particularly prominent in the aftermath of the COVID-19 pandemic and the post-pandemic era. Their goal is to enhance their financial services, satisfy their customers, and gain a competitive position among existing banks. To achieve this, they have taken various measures and actions to adapt different financial technology applications in accordance with Islamic Sharia principles.

1. Concept of Islamic Financial Technology

Islamic financial technology is defined as all applications and products of financial technology that are compliant with Islamic Sharia principles and adopted by Islamic financial and banking institutions. Despite the relatively short period and the small number of Islamic financial technology platforms established in several countries in the Islamic world, totaling about 120 platforms in comparison to over 2,000 traditional financial technology platforms scattered around the world, they have achieved remarkable results. These platforms have demonstrated that the effective use of new financial technologies, coupled with innovative business models in a regulatory and legislative environment that aligns with the objectives of Islamic Sharia, along with qualified human resources, enhances confidence in Islamic finance and banking.

This, in turn, enables them to meet the requirements and expectations of their customers, leading to increased interest in their products and expanded investments. It has prompted countries in the Arab world, such as the United Arab Emirates, Saudi Arabia, Qatar, Kuwait, Bahrain, and Asian countries like Malaysia and Indonesia, to embrace financial technology(Wesam, 2021, p. 405).

2. Distribution of Islamic FinTech Companies Worldwide

Islamic financial technology has provided more opportunities for innovation in financial services for banks and financial institutions worldwide, especially during the challenging times they faced, experiencing a lack of innovation in the banking and finance industry (Raza Rabban, 2020). Over the last few years, the number of Islamic FinTech companies has increased significantly, from 116 companies in 2017 to 136 companies in 2019. In July 2020, the "IFN Islamic Fintech" foundation revealed the presence of at least 142 Islamic fintech companies worldwide. The following table shows the distribution of institutions operating in the field of Islamic financial technology by country for the first half of 2020:

Table 02:Distribution of Islamic FinTech Companies by Country (July 2020)

Theranking	Country	Numberof companies
1	United Kingdom	27
2	Malaysia	19
3	United ArabEmirates	15
4	Indonesia	13
5	Saudi Arabia	9
6	USA	9
7	Othercountries	50
Total number of global Islamic fintech companies		142

Source:(Faridi, 2019)

According to the table above, companies operating in Islamic financial technology are concentrated in six countries. The United Kingdom leads with 27 companies offering Sharia-compliant financial products, followed by Malaysia with 19 such companies. The United Arab Emirates is home to at least 15 Islamic fintech companies, Indonesia has 13 companies, Saudi Arabia has 9 companies, and the USA has 9 companies of this kind. Islamic fintech companies are distributed across 12 sectors, as shown in the following table:

Table 03: Distribution of Emerging Islamic FinTech Companies by Primary Sector (2020)

Field	Number of institutions	Field	Number of institutions
Blockchain and cryptocurrencies	22	Alternative finance	9
Payments, money transfer, and forex	20	Personal finance management	7
Peer-to-peer (p2p) lending	20	Cognitive infrastructure for the 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 number of global islamic financial technology companies			143

Source:(Landscap, 2020)

It is worth noting that the discrepancy in the table above in terms of the number of companies is due to the fact that Ethis, a company with offices in Indonesia, Malaysia, and Dubai, falls into two categories: P2P crowdfunding and the knowledge infrastructure for the Islamic economy. Referring back to the data in Table No. (02), we find that Islamic fintech primarily relies on business and consumer financing and international money transfers (62 companies), in line with the digital economic trends in Islamic economies, such as participatory economics and e-commerce. It also has a lower reliance on trading and investment, crowdfunding platforms, and market-unifying banks. It has a much lower reliance on takaful insurance (only two companies).

3. The Role of Financial Technology in Enhancing Islamic Banking Services

Malaysia, Indonesia, and Gulf Cooperation Council (GCC) countries are among the early adopters of Islamic financial technology to enhance the performance of their Islamic banks. While they initially applied financial technology in limited services such as online payments and mobile banking, they have managed to introduce new products and improve their services by leveraging digital technologies. These technologies have contributed to increasing the efficiency and competitiveness of these banks. According to a survey conducted by Ernst & Young (EY), the results showed that 78% of bank customers in the GCC countries are interested in enhancing electronic banking services by adopting more digital technology solutions(Mahmoud, 2016).

4. Advantages of Applying Financial Technology in Islamic Banks

When discussing banks and their relationship with financial technology, it can be said that this technology and its various applications represent both opportunities and challenges for banks and financial institutions. This necessitates banks and regulatory authorities to balance maintaining the safety and soundness of the banking system with developing innovation in the financial and banking sectors. Financial technology helps create new growth opportunities for the Islamic banking industry through faster execution and better transaction tracking.

The following are the main opportunities provided by financial technology for the Islamic banking industry(Krouche & Zahra, 2020, pp. 126-127):

- **Ease and Speed of Transactions:** This particularly applies to payment and money transfer services. Islamic finance industry players can leverage the potential of financial technology and other innovations to enhance their services and attractiveness. Additionally, technology can reduce costs, allowing for the redistribution of employees to higher-value-added operations.

- **Transaction Tracking:** The use of blockchain technology can help reduce the Islamic finance industry's exposure to security risks related to transactions and identity theft. Blockchain can address three challenges related to issuing and managing Sukuk (Islamic bonds) by tracking underlying assets, cash flows, and investors.

- **Improving Governance:** Regulatory technology can provide the Islamic finance industry with more robust tools to achieve compliance with regulatory and Sharia requirements. It can also reduce reputation risks associated with potential Sharia compliance violations and allow scholars to focus on innovation. Providing the necessary physical infrastructure and implementing the required regulatory and supervisory framework is a fundamental requirement for enriching the Islamic finance industry through financial technology.

- **Greater Accessibility to Islamic Finance Services:** Financial technology helps Islamic banking expand its reach and cater to previously underserved customer segments. For example, providing mobile banking services to customers in remote areas or offering products like low-cost housing cooperative financing or financing for small and medium-sized enterprises can open up new growth prospects for Islamic banks.

5. Challenges of Adopting Financial Technology in Islamic Banking Industry

Despite all the opportunities that technology provides to various sectors, including the banking sector, it is also associated with several challenges and risks. Islamic finance institutions face greater challenges due to the evolution of financial technology, given their emerging status. They suffer from lower levels of digitization compared to traditional finance. Islamic banks still struggle with limited customer penetration into mobile banking services compared to conventional banks. According to the Boston Consulting Group (BCG), banks that lag behind in digitization may witness a decline in profits ranging from 15% to 30% in the coming years compared to their digitally accelerating competitors.

One of the potential significant impacts of financial technology on Islamic finance is the expansion of Islamic financial services as an alternative to traditional finance, especially in markets where the concept of Islamic finance has not yet matured. However, traditional Islamic finance providers will face tougher competition and margin pressure due to the influence of financial technology(Krouche & Zahra, 2020, p. 127).

III. Presenting the Malaysian Experience in Utilizing Financial Technology Applications to Develop Islamic Banking

The discussion about Islamic banks in Malaysia began in 1963 when Malaysian Muslims started looking for a way to save money for their pilgrimage. They established an organization called "Tabong Haji" in November 1962, and it officially started operating in 1963. One of the most important Malaysian Islamic banks is "Bank Islam," which was founded on July 1, 1983, and is considered the first independent Islamic bank. After the encouraging performance of "Bank Islam," the Malaysian government set its goal to become one of the world's leading centers for Islamic banking. Many commercial banks in Malaysia transformed into Islamic banks, offering Islamic products. "Bank Muamalat Malaysia" is the second-largest Islamic bank, followed by several other Islamic banks (Khunni & Ibtisam, 2017).

1. Factors of Islamic Banking Success in Malaysia

The success of the Malaysian experience in adopting Islamic banking can be primarily attributed to the presence of several key factors. The most significant of these include complete governmental support for the sector to encourage its development and expansion. This support is supplemented by the existence of legal and regulatory frameworks for its transactions, facilitated by multiple advisory and oversight bodies and specialized research institutions. These institutions receive funding for scientific research in this field and provide sponsorship for training programs as well as scholarships and other forms of support(Megawieb, 2015).

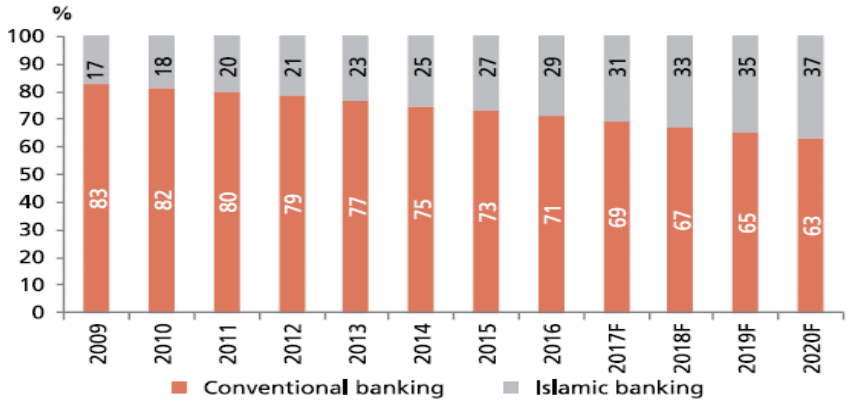
Additional diverse factors contributing to the success of Islamic banking in Malaysia include(Ahmed, 2015):

❖ **Diverse Range of Banking Products:** Islamic financial products have been formulated using principles such as Mudarabah, Ijarah, Murabahah, Musyarakah, Wakalah, Kafalah, and more. Malaysian Islamic banks offer over 50 different products and services.

❖ **Ability to Mitigate Financial Risks:**Malaysia managed to establish an interbank market to address the liquidity issue in Islamic finance by adhering to strict Islamic finance rules. In 1994, Malaysia's central bank, Bank Negara, created an Islamic financial market with the aim of enabling Islamic banks to invest in other Islamic banks according to Islamic finance principles using a dedicated financial instrument. This market allowed participatory investment between Islamic banks, adhering to profit-sharing principles. The Malaysian government also launched

various government investment issues (GII) and risk-free government investment certificates compliant with Islamic law (Sharia). Additionally, Malaysia developed tradable "Bay al-Inah" contracts in the secondary market, further strengthening the interbank Islamic finance market and reducing the liquidity risk. Bank Negara was designated as the lender for Islamic banks in 1999, and Islamic Treasury Bills (ITB) were introduced in 2004, making them the world's first Islamic Treasury Bills. These initiatives contributed to the growth of Islamic assets in Malaysian Islamic banks, particularly during the global financial crisis of 2008, as depicted in the figure.

Figure 01: Evolution of Assets in Malaysian Islamic Banks (%) for 2020



Source: Annual reports (2021), BNM, DBS BANK

As observed in the above figure, Islamic finance has been experiencing continuous growth during the study period. The percentage of Islamic finance as part of the total finance reached approximately 31% in Malaysian Islamic banks. In this regard, the Malaysian government set four main objectives for the Islamic finance industry in its five-year plan for 2016-2020:

- Increase the market share of Islamic financial assets from 8% to 13% (supported by specialized Malaysian funds).

- Raise the market share of Malaysian insurance companies.

- Achieve a 40% share of Islamic finance in Malaysia by 2020.

- Establish Malaysia as one of the top ten major contributors in the global Islamic finance industry. At the end of the study period, Islamic banks had begun issuing 32 bonds in foreign currencies (USD, CNY, JPY, SGD) through Malaysian money changers, both for local and foreign investors.

Malaysia's approach, along with its commitment to ensuring legal, regulatory, and precautionary frameworks, has allowed it to create a conducive infrastructure. This infrastructure aims to

encourage and stimulate the issuance, listing, and trading of Islamic instruments in Sharia-compliant financial markets, making Malaysia one of the leading countries in the global development of Islamic financial markets.

❖ **Global Sukuk Issuances:** The process of Sukuk issuance in Malaysia witnessed several changes during the period from 2001 to 2016. Despite the decline experienced since 2013 due to the decision of the Malaysian Central Bank, Bank Negara, to reduce Sukuk issuance, Malaysia remains a leader in the Sukuk market. This is evident both in terms of the total value of issuances and the number of issuances. Malaysia controlled approximately 24.68% of international Sukuk issuances and around 76.4% of domestic issuances(Bouriche & Lachhab, 2015).

2. Financial Technology and Islamic Banking in Malaysia

The financial technology landscape in Malaysia is characterized by diversity, with 13 types of financial technology available. Payment solutions top the list, accounting for 20% of the types due to the widespread adoption of mobile payments in the society as it is considered a cost-effective and faster way to settle transactions. E-wallets follow at 19%, while the other types are distributed between 3% and 8%. This diversity is attributed to the Malaysian government's interest in developing this sector, as well as the availability of expertise and human resources with modern technologies. One of the most prominent aspects of financial technology in Malaysia is the launch of the first Islamic investment platform, known as the Investment Account Platform (IAP), in 2015. This platform allows individuals, companies, and institutional investors to channel investment funds through Islamic banks, providing financing to customers who apply online. The investment platform represents the first Islamic financial solution offered by a group of Malaysian Islamic banks, indicating their desire to embrace the financial technology revolution (Wafali, 2020).

Following this, the Securities Commission Malaysia, as part of the initiative known as "The Affinity of the Fintech Community" (afFINity@SE), worked on preparing regulations that would allow financial technologies to operate smoothly. The initiative included the following(Wafali, 2020):

- Raising awareness and promoting innovative technological solutions.
- Establishing groups to regulate and oversee a broader financial environment.
- Providing a conducive political and regulatory climate for innovation.

The aim of this initiative was to enable a diverse range of companies to participate and enter the finance market through a digital platform. A crowdfunding and peer-to-peer (P2P) lending

framework was issued at the beginning of 2016. According to the credit rating agency Standard and Poor's, the Islamic finance industry, which amounted to $22.2 trillion in 2021, is globally led by Malaysia in adopting financial technology. The table below shows the number of Islamic financial technology companies in Malaysia and some countries worldwide.

Table 04: Islamic FinTech Companies Providing Islamic Financing in Malaysia

Islamic FinTech Companies	Name of Islamic FinTech Company	Primary Activity
1	EthisKapital	Peer-to-peer lending platform
2	As-Sidk	The Fund provides a platform for crowdfunding approved by twenty institutions in Malaysia
3	Finterra	Finterra offers cloud-based financial services
4	Global Sadaqah	Donation-based crowdfunding platform
5	Payhalal	Payment gateway compliant with Sharia standards
6	Wakaful	Digital financial services in accordance with Waqf principles

Source:(Hasan, Kabir, & Aliyus, 2020, p. 82)

From the above table, it can be seen that Malaysia offers a diverse range of services provided by emerging companies specializing in Islamic financial technology, which has significantly contributed to the growth of Islamic financial technology.

3. Technological Innovations in the Malaysian Financial Services Industry

The Malaysian government has actively embraced any financial technological innovation that serves the interests of its Islamic banks. It has adopted several of these innovations, including:

3.1 Investment Account Platform (IAP)

3.1.1 Definition of the Investment Account Platform (IAP)

The IAP is a fully-owned subsidiary of the Raeed Holdings Group, comprising four Islamic banks in Malaysia: "Bank Islam Malaysia," "Maybank Islamic," "CIMB Islamic," and "Public Islamic Bank." Later, "RHB Bank" and the "National Savings Bank" joined the consortium. The platform represents a new mechanism that enables entrepreneurs to obtain capital to finance

their projects, offering a new dimension for diversifying financing options. This experience goes beyond being a mere new and innovative investment tool; it is an initiative to pool funds in a Shariah-compliant manner.

The Investment Account Platform, launched in February 2015 in Malaysia, serves as a clear example of collaborative strategies in financial technology. It is changing the rules of the game by introducing innovation and creativity into the markets. It is the first online platform that combines banking facilities and brings together banking experts and competent technicians to channel investors' funds into vital economic projects(Bin Mohd & Bin Hassanudin, 2017, p. 118). Under this mechanism, Islamic banks assess companies seeking financing, allowing a secondary market for investors, and, in some cases, acting as underwriters for stock deals. The Islamic Financial Services Act issued by the government in 2013 compelled Islamic banks to differentiate between deposits and investment accounts, driving them to diversify the financial products offered to customers. The percentage of investment accounts relative to total financing provided by Islamic banks rose from 7% in August 2015 to 10% in December of the same year. The platform is also open to international investors, and the government has not placed restrictions on foreign capital inflows(Islamic economy, 2016).

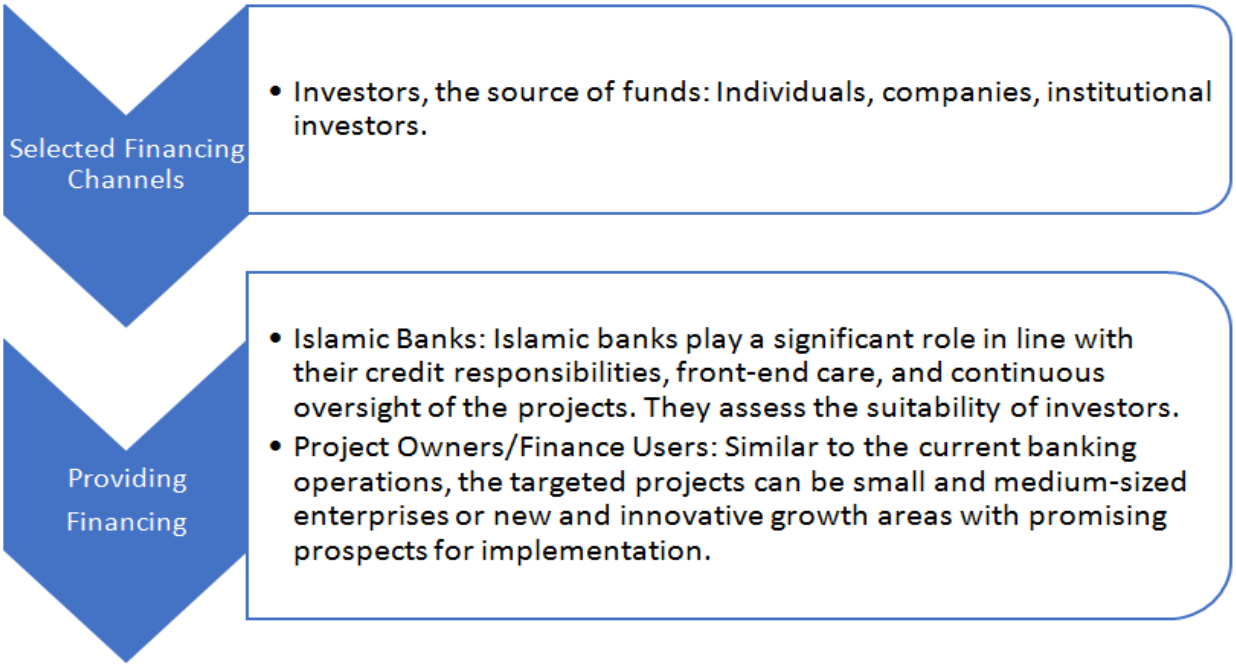
3.1.2 The operation mechanism of the Investment Account Platform for Malaysian banks

The following steps outline the operation mechanism of the Investment Account Platform for Malaysian banks(Saeed, 2016, p. 14):

- The Malaysian Rating Agency (RAM) determines the credit rating for these projects.
- Banks examine the projects.
- Entrepreneurs (individuals, companies, small enterprises, medium-sized enterprises, startups with specific projects) apply.
- Banks list these projects on the Investment Account Platform.
- Investors (individuals or companies) fund these projects through the banks via the platform.
- Companies obtain the required capital to finance their projects.
- Investors receive periodic updates to keep them informed about the project's progress.
- At the end of this financing, investors receive returns on their investment and contribute to the development of Malaysian Islamic financial products.

Through the aforementioned steps detailing the operation of the Investment Account Platform for Malaysian banks, it becomes evident that this platform has significantly simplified the routine procedures for investment, saving time and costs. This, in turn, attracts many stakeholders to Malaysian Islamic banks, offering them the opportunity to benefit from this digital investment experience and its services.

Figure 2: Operation Mechanism of the Investment Account Platform (IAP)



Source: Prepared by the researchers based on: www.mifc.com/index.php

3.1.3 Advantages of the Investment Account Platform

The Investment Account Platform offers several advantages that make it of interest to various parties:

- Investment and financing are in accordance with Islamic principles.
- It provides an opportunity to diversify the investment portfolio with viable projects.
- Quality control and the assimilation of important information for decision-making.
- Regular supervision.
- Transactions are regulated by the Islamic Financial Services Act.
- Participating Islamic banks have a good reputation.

- Disclosure of project information facilitates investment decisions.
- It is user-friendly and easily accessible from anywhere at any time.
- Open to various types of projects and businesses.
- It serves as a multi-currency channel for connecting regional and global economies across borders.

3.2 Malaysian Digital Economy Corporation (MDEC)

The Malaysian government established the Malaysian Digital Economy Corporation (MDEC) as an entity responsible for the digital business ecosystem in Malaysia. This organization works closely with the halal ecosystem by issuing Islamic Shariah certification. Furthermore, a significant step was taken in 2019 when Malaysia and Qatar collaborated to launch the first Islamic electronic platform for the exchange of gold-backed digital currencies. It was named I-DINAR and was designed to be Shariah-compliant. Within this Islamic electronic platform, 1 DINAR was defined as 1 gram of gold, meaning it also forms a gold portfolio, providing security and ease for investors and users and facilitating swift financial transactions.

Additionally, the Central Bank of Malaysia (Bank Negara) and the Securities Commission (SC) released the Regulatory Sandbox framework for FinTech and the regulatory principles for Crowdfunding. The use of Regulatory Technology (RegTech) in FinTech aims to reduce risks associated with potential Shariah compliance violations(Abd Razzak, 2020).

In 2016, the Islamic FinTech Alliance was established by companies supporting Islamic FinTech services, including peer-to-peer crowdfunding platform providers led by Ethis Ventures. Other companies like "Zakat," "Fundaztic," "Ethis," "Narwi," "LaunchGood," "KapitalBoost," and "Skolafund" joined the alliance.

Moreover, the Central Bank of Malaysia (Bank Negara) created a regulatory framework for Islamic FinTech to enable the deployment and innovation of Islamic FinTech and to test it in a live environment, following specific criteria and timelines. This demonstrates that the Malaysian government is taking serious steps to integrate Islamic technology by involving market players and regulators(Hadiyan & Azman, 2020, pp. 9-19).

3.3 Digital Transactions Based on Blockchain Technology

Blockchain, or blockchain technology, is a database that stores records and transactions on multiple computers, enabling decentralized control according to an agreed-upon policy. Data is

stored collectively in blocks, which are linked together to form a blockchain(Elrom, 2019). Any Islamic bank can create a new trading platform (or migrate to an existing trading platform) using blockchain technology. This technology allows for the support of peer-to-peer asset exchanges without central credit or intermediaries, eliminating the risk of double spending. Blockchain can address the threat of fraud across various banking domains, offering transparency and immutability. It can provide security and authenticity as well. Malaysia initiated a project to explore the use of Distributed Ledger Technology (DLT) or blockchain for unlisted companies on the over-the-counter (OTC) trading market through the aFINity.SC innovation lab. This lab serves as a platform to facilitate testing of new digital innovations within the Islamic finance industry (Hazik, Hassnian, & Thalassinos, 2020).

Blockchain also supports smart sukuk (Islamic bonds), where the smart contract encodes the business rules directly into the core payment process - the blockchain. It enforces contract rules related to payments and transfer of ownership. Organizations seeking to raise funds can issue smart sukuk through companies like Blossom, which gathers funds from investors in exchange for tokens representing ownership of the sukuk. When the organization makes a payment, funds are automatically redistributed to smart sukuk token holders via blockchain according to the contract rules, without the need for traditional banks or intermediaries (Blossomfinance, 2018).

3.4 Applications of Artificial Intelligence in Malaysian Islamic Finance

Artificial intelligence (AI) is a field of science and technology that involves integrating technology into various disciplines such as machine learning, psychology, linguistics, and mathematics to create automated systems capable of thinking, seeing, hearing, and speaking. The best financial service bank in Malaysia, MBSB, has already adopted SKIL-RSA modules for its documentation-based products and launched banking units and customer units on the MBSB web platform. The Banker module is used by Sharia employees and internal staff seeking a better understanding of the offered products, along with the smart financial planning tool. SKIL-RSA provides an integrated online platform for selective Islamic topics and remains relatively expensive despite the promising features of artificial intelligence (Garewal, 2020).

3.5 Establishment of the Financial Technology Empowerment Group (FTEG)

This group was established by the Malaysian central bank, Bank Negara, in June 2016. It consists of a multi-functional team within the central bank and is responsible for formulating and enhancing regulatory policies to facilitate the adoption of technological innovations in the Islamic financial services industry in Malaysia(Offshore Company, 2019).

Conclusion

Despite the integration of financial technology into the world of Islamic finance, it remains relatively modest compared to traditional finance. However, it presents a significant opportunity for the Islamic banking industry. It offers innovative electronic systems and programs that help banks develop and enhance their performance, providing innovative services that align with customer requirements, particularly in favorable circumstances. Many banks have made significant efforts to secure a prominent position in the global banking industry, overcoming challenges and obstacles. Malaysia, in particular, has been fortunate in integrating financial technology into its Islamic financial services, aided by government support and the creation of a technological infrastructure to support the growth and development of Islamic finance.

Study Findings

Through this research paper, we aimed to gain insight into the contributions of financial technology to the development of the Malaysian Islamic banking industry. After addressing various aspects of the topic, we have extracted the following findings:

- Financial technology is globally characterized by diverse technologies and areas of application.

- Although the Islamic banking industry has embraced financial technology, it has yet to take significant strides toward global leadership in the banking industry.

- Financial technology is an essential necessity for the Islamic banking industry, offering modern technologies that save time, effort, and reduce costs while ensuring transparency in financial transactions.

- Blockchain is one of the most critical financial technologies available for developing Islamic banking products, providing security, decentralization, speed, and efficiency.

- Financial technology creates a type of challenge and competition among countries to innovate new financial products and services within their Islamic banking sectors, as exemplified by Malaysia.

- Malaysia's experience has demonstrated its progress in the Islamic banking industry through various applications of financial technology, such as the creation of the Investment Account Platform (IAP), which has significantly saved time, effort, and resources. Additionally, it applied artificial intelligence in Islamic finance, as well as the issuance of a digital currency backed by gold in collaboration with Qatar.

Study Recommendations

Based on the above results, we propose a set of recommendations to enhance the adoption of financial technology applications for the advancement of the Malaysian Islamic banking industry:

- Continuous training and development for human capital specialized in financial technology.

- Collaboration between Islamic banks and startup companies specializing in financial technology to leverage their expertise.

- Adaptation of legal and administrative procedures to meet the requirements of financial technology in all transactions.

- The necessity of establishing regulations and regulations before implementing any technology in the field of financial technology to avoid and reduce risks.

- The international union of Islamic banks, particularly in the field of financial technology, to foster further development and dissemination.

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