

## THE IMPACT OF FINTECH ON SHARIA'H COMPLIANCE AND DECISION-MAKING PROCESS IN ISLAMIC FINANCIAL INSTITUTIONS

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### ABSTRACT

*Financial technologies have proven to incorporate high security and privacy policies that has further gained the trust of its clients. FinTech in Islamic finance is still new and is yet to reach greater milestones of research and development. This paper measures the impact of integrating financial technologies on Sharia'h-compliance and decision-making efficiency of financial institutions. The methodology used for collecting data was through questionnaires and interviews which were distributed to employees of Islamic financial institutions that have incorporated FinTech. The findings of this paper represent a positive relationship of FinTech on Sharia'h compliance and decision making. The significant contribution is that this is based on empirical evidence gathered from surveying 48 experts in various Islamic Financial Institutions. Findings of this research have proved that the core objective for Islamic Financial Institutions (IFIs) to integrate FinTech is to provide better transparency that will subsequently facilitate in making more efficient decisions and improving Sharia'h audit functions. The research limitations were the lack of information on Islamic sharia regarding FinTech, as well as the lack of survey response from a wide scope of institutions.*

*Keywords:* FinTech, Islamic Finance, Financial technologies, Sharia'h Compliance, IFIs.

### INTRODUCTION

#### Research Background

Since 2010, there has been a disruptive technological rise in incorporating technologies like block chain into the region of finance known as Financial Technology/ies (FinTech/s). FinTech has provided numerous platforms for businesses and customers to transact in an efficient and most transparent manner. Some of these platforms are namely, Peer-to-Peer (P2P) lending (*borrowing from individual investors rather than financial investors*), crowdfunding (*using the internet to raise funds from a large group of people*), deposits, trade financing, wealth management, insurance and much more. For a while, FinTech was prompted as a threat to traditional banks. However, this digital innovation is creating new opportunities for banks and FinTech companies to collaborate on cutting-edge financial services solutions. Compared to the 7,500 conventional FinTech companies, Islamic FinTech organizations are very scarce.

Moreover, at the same year 2010, \$110 billion have been raised by 7,500 FinTech firms globally. Only in 2018, \$58 billion were raised by global FinTech companies. (Dinar Standard, 2018). The main reason for the growth of FinTech is apportioned to three main benefits. Firstly, it offers greater amount of automation which produces results in a short span. Secondly, FinTech enables more transparent and open access to services connected with cloud due to the elimination of unnecessary intermediaries. Thirdly, it is highly secured, and all services are independent resulting in decentralization. This makes it a critical reason for Islamic finance to be included in the bubble of financial technology as it is the future of finance. FinTech can prove to uplift and improve the Islamic banking mechanism to a large degree.

Due to the above reasons, here lay the importance of the research paper that focuses on FinTech in Islamic Financial Institutions (hereafter IFIs). This paper does not focus on United Arab Emirates only, as fintech is a new concept and it is not used widely in Islamic finances. For instance, the paper focused solely on a single country then sufficient information could not have been gathered. Which is why there has to be research conducted on various countries, locations and regions so that as many responses and results on this topic could be collected. This paper broadly answers the research question, whether financial technologies influence Islamic Financial Institutions positively or negatively and whether it is crucial for authorities to support these advancements. The following section of this paper includes a comprehensive literature review, study design and methods, discussion, results and findings, and conclusion and recommendations.

#### Problem Statement

For the conventional financial institutions, FinTech hardly has any restrictions, because of which they are more flexible to adapt to this technology in rather easier ways. However, Islamic finance system holds for various prohibitions laid down by their faith – although exhaustive. Hence, there are many issues being raised by various Islamic associations and scholars regarding its permissibility. Regardless, FinTech is proved to be the future of finance industry. This will impact the Islamic finance sector differently than the conventional finance sector. IFIs, which is a part of the Islamic finance, face huge challenges when it comes to complying with the *Sharia'h* and the degree of compliance. Most commonly, various *Sharia'h* committees have different views on the permissibility of certain cases. This causes confusion to the operations department and results in lower customer reliance. Additionally, Islamic banks face lengthy decision-making processes due to the unique nature of each case which also results in lower performance of banks. Therefore, the applications and features provided by FinTech must be targeted to resolve such issues. Accordingly, the research paper is aimed at identifying the Islamic financial institution's objective behind incorporating FinTech. Also, it will identify the impact of FinTech on *Sharia'h* compliance. Lastly, the research paper will establish the efficiency of decision-making process aided by financial technologies. The research paper aims to solve problems of delayed decision-making processes and biased *Sharia'h* compliance, which aims to prove that financial technology can help banks to decide the most

favorable decision, and the accuracy of *Sharia'h* compliance objectively. The research can help Islamic financial institutions- who underestimate FinTech- to realize the benefits of FinTech on this sector and that they must start to incorporate it before they become obsolete.

The problem statement here is that there are many contradictions, confusions, and delays when it comes to *Sharia'h* compliance. The reason for this is because of scholars having varied opinions which leads to lower customer satisfaction and trust. This research will investigate if financial technology can bring out a more objective way of decision making that can also smoothen workflow.

## LITERATURE REVIEW

### FinTech Applications and its Impact

Vives (2017) conducted research on the impact of financial technologies on the banking sector. The researcher finds that, FinTech is influencing the banking sector significantly. Due to the revolution of big data, technology has the capability to disrupt financial institutions that have been in business for centuries. Integration of financial technologies in traditional financial institutions like banks proved to improve various operations. In Addition, FinTech integration has helped banks to reduce their costs and improve quality of products and services leading to higher customer satisfaction levels. It has enabled banks to perform more efficient know your customer (KYC) and anti-money laundering functions. The research also finds that financial institutions that are FinTech friendly are much more capable than traditional banks in assessing customer creditworthiness. This is because FinTech enables the screening of existing data coupled with other dimensions of data that is not accessible by traditional banking systems. Asymmetrical information is also one of the most important challenges faced by traditional banking systems that can be solved through FinTech. Digital Crowdfunding and (P2P) lending are one of the most innovative platforms introduced by financial technologies that allow the investors to choose their projects and, assigns risk percentage of each project or business to enable investors to make better decisions. Vives (2017) also points that the disadvantage of integrating FinTech is the obsolescence of regulations and irrelevant governmental laws. Laws and regulations are slowing the growth of financial technologies as technology is advancing five times faster than regulations.

Another research by Teodoro (2018) states that P2P and crowdfunding platforms have increased financial inclusion and reduced the huge financial gap in Muslim countries. P2P funding has gained the trust of many Muslim populations who have never approached banks due to the fear of dealing with banks. Teodoro (2018) has found that P2P funding is expected to close credit gaps worth \$70 billion in Indonesia.

A research report by Ernst & Young found that most of the GCC banking industry underestimated the ability of FinTech advantaged firms to grab their market share (Ernst & Young Global, 2017). Due to this underestimation coupled with the challenge of scarce human resources that are proficient in information technology to facilitate FinTech program development, the GCC region is lagging. In the GCC region, only 7% of the IFIs had proven to be successful in incorporating FinTech applications, and 35% of the IFIs have not at all integrated financial technologies. This is due to the resistance and short-term profit goals of these organizations (Ernst & Young Global, 2017). Moreover, the report emphasizes that IFIs preferred to collaborate than compete with FinTech firms to achieve their FinTech projects. Lukonga, (2018) stated that the compound annual growth rate of FinTech firms in twelve MENA countries increased by 40% in 2016 from 2011. Many firms have placed huge investments in the IT department and have also accomplished the establishment of digital banks. The GCC region is one of the most financially inclusive regions among the MENA countries. It was found that although this region is working towards FinTech establishments, the pace of their developments is lower compared to the western and European regions (Lukonga, 2018). UAE has set aside US\$100 million for Islamic FinTech. Additionally, there are more than 80 Islamic FinTech startups with more companies on the way, according to Dubai Islamic economy development center. (Dinar Standard, 2018)

According to a survey, India had over 1,500 fintech beginning between 2015 and 2018, surpassing Germany, the United Kingdom, and Singapore as the fastest expanding ecosystems in this industry. It was once restricted to backend systems, but it is now widely utilized in online payments, mobile payments, financial management, stocks, and so on. In different words, it has altered the financial ecosystem and digitally modified the main payment method procedure. (Kapoor, 2020)

Multi-currency electronic transactions are now the standard, peer-to-peer financing is more common than going through an application process at a bank, and insurance claims can be carried out from the comfort of your own home in a matter of minutes. According to [decode agency article](#) "each innovative abilities of this type is deliberately designed to deal with old, time-consuming processes that appear archaic in comparison to abilities in other consumer sectors". (Luetic, 2021)

Whereas previously, cash transmission was both slow and expensive. As a result, FinTech startups began to flourish in this industry. As per the Think with Google platform, 69 percent of smartphone users prefer to transfer money via a phone app rather than a website. Transfer Wise, for example, is one of many online money transfer businesses. This allows small businesses and private users to send money at a lesser cost. (Jeric, 2019)

According to [BIS Papers](#) an article investigates the implications of digital innovation for market structure and associated policies, such as finance and competition regulation. Several surveys of regulatory responses have been conducted. This study takes a step back to examine consider what economic theory of banking and financial intermediation may teach us concerning how technology may drive industrial organization in the area, and how could help shape future policy approaches (Erik Feyen, Jon Frost, Leonardo Gambacorta, Harish Natarajan and Matthew Saal, 2021). Over the last decade, financial technologies have changed banking and financial services operations around the world. It has substantially streamlined the lives of both customers and banking officials.(Dabbeeru & Rao, 2021).

According to Forbes Wealth tech (software like Wealth simple, an electronic money management platform), invest tech (like Acorns, which allows users to round up transactions to the closest dollar and invest the change in a diverse portfolio), and insurtech are also subsets of fintech (such as Next Insurance, a mobile-first carrier). It does have applications in almost every sector, geographic market, and corporate strategy. (Walden, 2021)

Banks employ fintech for various back-end processes—for example, behind-the-scenes tracking of financial accounts consumer-facing solutions, such as the app you use to check your balance. Individuals utilize fintech for anything from tax calculations to market speculation, with no prior investing knowledge required.

The impact of this overgrowing fintech application is quite high in the conventional industry. Below paragraphs explore some criteria that is unique to Islamic finance and how fintech can influence those.

### Sharia Compliance

In Islamic finance industry, the most fundamental requirement for *Sharia*'h-compliant transactions is transparency. By far, block chain has proved to be a technology that facilitates optimum transparency (Lacasse, et al., 2017). Within the block chain realm, there are coded contracts also known as smart contracts that are free of any uncertain and ambiguous elements due to computer encoding process. After the smart contract is finalized and has been entered in the block chain panel, it is impossible to remodify the contract which proves a high degree of transparency that is required for *Sharia*'h compliance. Lacasse, Lambert and Khan (2017) found that investors can invest through utilization of smart contracts that can help the bank to analyze the *Sharia*'h aspects of the transactions easily. Additionally, all *Sharia*'h rules and regulations can be encoded into the smart contracts and the system will automatically adhere to it. Transactions that do not comply with *Sharia*'h codes will be automatically revoked. Smart contracts are a great tool to enforce *Sharia*'h compliancy; and can reduce the IFI's time and costs spent on monitoring, regulating, and auditing significantly. A major advantage of this technology is the ability to generate real-time reports and to swiftly conduct surprise audits, by providing external auditors with block chain ledgers. An important issue with smart contracts is that not all stakeholders and agents understand the programming codes, as it is highly technical and can be interpreted only by skilled programmers. As *Sharia*'h forbids to enter contracts that cannot be understood, researchers suggest that international organizations like Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI) can set standards for smart contracts that must be followed throughout IFIs. Furthermore, AAOIFI can provide banks with templates for each kind of smart contract based on the bank's underlying financial service. Recently, AAOIFI has issued standard templates for smart contracts serving various *Sharia*'h-compliant products. This standard is also known international standards for Islamic financial smart contracts (ISIFSC). Using this fundamental smart contract as a base, programmers can customize further according to organizational requirements, without being able to modify the standard. This provides uniform contracts, increases trust of all stakeholders, reduces overhead costs to program a contract from scratch every time, speeds up transaction process and increases transparency. The researchers found that a successful *Sharia*'h -compliant banking platform is only possible with constant communication between sectors during standardization and post-standardization (Lacasse, et al., 2017).

According to a study conducted by Ridhwan (2014), the incorporation of financial technologies significantly reduces *Sharia*'h-noncompliance risk. He suggests that applying big data analytics can prove to be beneficial for *Sharia*'h compliance and governance. In IFIs the process would involve input, principles, analytics, and output. The institution must first input all Islamic finance products and services, assign related *Sharia*'h principles to each product, analyze compilation of principles data set for each product and integrate analytics results in various risk management process. Big data is not quite different from block chain. Rather, block chain and big data are highly complementary to each other. Block chain is an additional layer of technology under the big data component. However, one of the major challenges of FinTech in Islamic finance is the issue of *Sharia*'h compliance that must be sorted cohesively with scholars (Rabban, et al., 2020). FinTech is still underdeveloped in the Islamic finance world, especially due to a minority of participants, insufficient investors, and undefined global *Sharia*'h standards (Biancone, et al., 2019). FinTech backbone facilitators such as policy frameworks and skilled workforce are redundant that are limiting the development of Islamic FinTech (Rusydiana, 2018).

Oseni and Ali (2019) emphasized much on the *Sharia*'h aspects of FinTech. Their book states that FinTech can be used to the benefit of Islamic finance by applying the same principles that are used for traditional transactions. FinTech can be smoothly incorporated by just separating the prohibited elements. However, the authors strictly state that all this will be operational only when legal adaptation is addressed to this issue.

According to majority of the scholars, *Maqasid al Sharia*'h is relevant to FinTech technicalities as well. Additionally, as discussed by early Muslim scholars, the public interest will always be favorable than private interest. Since financial technology is in the best interest of public and future generations, it is deserved permissible. Regarding *Sharia*'h compliancy, the authors are of the view that FinTech in its true nature is much more favorable for Islamic based transactions than it is perceived to be. For instance, ethical screening, *Sharia*'h advisory and product structures are much more efficient with the use of these technologies. FinTech is permissible when managed within the boundaries of Islamic law and has great potential to uplift the socio-economic environment (Billah, 2020). Many initiatives and startups are already on their way to disrupt traditional Islamic banking. Some of such initiatives include Malaysia's multi-currency investment account platform and *bursa suq al sila* (BSAS), that features liquidity management which provides facilities for *murabaha* and *tawarruq* transactions (Ali & Mohamed, 2019).

Utami, Basrowi and Julianas (2019) studied the impact of FinTech on *Sharia*'h and corporate governance of BAZNAS- an Islamic charitable financial institution. They found that FinTech benefitted the company by increasing *Sharia*'h compliance levels due to increased transparency. They concluded that FinTech is very much compatible with *Sharia*'h unless there are any prohibited elements. Laldin & Furqani (2019) convey in their book that innovations for the purpose of bringing good to the community must

be encouraged. FinTech benefits the society largely currently and is completely permissible by scholars. They state that FinTech can prove to increase *Sharia'h* compliance of IFIs significantly, but IFIs should not rely blindly on technologies for *Sharia'h* matters and must conduct Periodic *Sharia'h* audits of FinTech systems, to be on the safer side.

### **Efficient Decision-Making**

Satpute & Das (2019) conducted research on how FinTech can aid in better credit decision making. They affirm that traditional legacy-based decision-making systems have proven to create many challenges for organizations despite going digital. These challenges relate to multiple disparate systems, customer data isolation, inflexible legacy systems, biased decision making and minimum transparency. They have researched on the methods that FinTech can automate decision making process to devise the most favorable decision. Finance firms must extract information intelligently by applying optical character recognition (OCR), intelligent character recognition and Natural language processing (NLP). These programming techniques are key to maintaining standardized customer data collection that can produce holistic reports of customer's involvements rather than fragmented data. This information is collected and stored through various FinTech applications such as stock trading, smart contracts, crowdfunding, supply chain auditing and much more. This intelligent storage and collection are consequently imported to the decision engine that produces optimum decisions and alternatives. Furthermore, the research states that a robust and flexible decision engine can only be designed when key components are allotted. Debugging provides a test framework to refine the decision criteria by running a quick test on the effectiveness of rules applied. Simulation platform tests the decisions before actual disposition and generates a possible impact of the decisions taken. Lastly, a decision repository suggests optimum decisions (and alternatives) and stores them for each product/service/client or investment. Automated decision engines prove to be ideal for organizations only when all data and processes are automated. This degree of automation has only been possible through FinTech applications that provide real time results (Middle East Global Advisors, 2015).

Lee & Shin (2017) researched that the real options approach is the best approach possible to make investment decisions related to FinTech. This approach gives investors a wide variety of decision alternatives in FinTech applications. These alternatives include option to defer investment, expand investment, scale contracts for projects at loss or abandon investment. They further suggest that this technique must be coupled with decision trees as it enables testing of decisions in real market and predicting its possible consequence.

Miskam, Shah Wahid, and Sholehuddin (2018) found that Malaysia started to integrate the Investment Account Platform (IAP) in 2015. According to the research IAP provides credit evaluation and transparent risk-return analysis that has improved the decision-making efficiency of IFIs. The firms which evidenced this improvement are Bank *Muamalat*, Bank *Raqyat* and Maybank *Islamic*. Furthermore, the decision-making elements of technologies are very generic and do not include prohibited elements of Sharia. This is because the decision-making engine bases all its alternatives and decisions according to inputs administered in the system.

Ghonaim (2017) devised a smart E market mechanism for sharia compliant transactions by incorporating stock/commodity trading via block chain. This system invention was specifically designed for commodity *Murabaha* cases by the researchers. The study proves that commodity/stock trading via block chain provides autonomous decision making that in return facilitates an efficient decision-making process.

A study conducted in the MENA region and Asia concluded that, since the introduction of FinTech a high amount of financial inclusion is being noticed. There is a 178% of growth rate in the users for FinTech between 2009 and 2014. Furthermore, the UAE has also advanced in its FinTech innovations, UAE has set aside US\$100 million for Islamic FinTech. Additionally, there are more than 80 Islamic FinTech startups with more companies on the way, according to Dubai Islamic economy development center. (Dinar Standard, 2018)

A similar platform to the Bursa Suq Al Sila (BSAS) in UAE is the Commodity *Murabaha* Trading Platform (CMTP). It enables transfer of ownership, possession, identifies underlying commodities, and supervises all series of transactions, smooth documentation through the usage of a single online platform. The usage of platform by banks is much favorable as the auditing committees has lesser possibilities of discrepancies. Furthermore, the authors conclude that the main reason why many advocates of Islamic finance do not see the relevance of *Sharia'h* in FinTech is because they are concentrating excessively on the technological aspect than the financial component of FinTech (MIFC, 2016). Efficient decision making is dependent on factors such as operational efficiency and transparency which can be improved through reporting and governance standards relevant to Islamic FinTech (Hasan, et al., 2020). Reduced time and costs are two other factors that facilitate in smooth decision making. Through FinTech integration, a significant amount of cost has been avoided and the financial institution is much more flexible in enabling financial services to its stakeholders (Hammadi & Nobanee, n.d.).

Compared to the research conducted on global FinTech, there are a smaller number of research that focus on FinTech in IFIs. Research conducted about Islamic FinTech have mainly focused on the arguments of *Sharia'h* rulings or have been compared with conventional FinTech. However, the current research depicts whether IFIs- in fact -are benefitting from FinTech applications on the most distinguishing variables of an IFI that are *Sharia'h* compliance and decision making.

**RESEARCH METHODOLOGY**

The research methodology involved an objective analysis in the form of a survey.



**Survey Method and Technique**

The survey was designed to establish the degree to which Islamic financial institutions have integrated financial technology. Furthermore, the survey aims to identify the different types of FinTech applications used across organizations and the effectiveness of these applications on the organization’s processes. The survey mainly focuses on identifying whether FinTech applications have positively or negatively impacted on *Sharia’h* compliancy and decision making. A total of thirteen questions are asked to the respondents out of which nine questions are required to be answered. The type of questions used to survey respondents vary from close ended multiple-choice questions, Likert scale questions, to rating questions.

**Data Collection**

The data was collected from a sample of 48 experts in the field on FinTech. The respondents belonged to various organizations including FinTech startups, Islamic banks, and Islamic windows in conventional banks, audit firms, regulatory authorities, and research institutions. The respondents surveyed and interviewed belong to the following companies: MUFG bank berhad, institute of management sciences, wahed invest, MCB Islamic bank Ltd., Silk Bank Ltd., Eman Islamic banking, Sharjah Islamic bank, 570easi, Bsalam, Pawoon, Qazwa and ADIB. Additionally, respondents could not be niched to a specific country or region because Islamic FinTech is relatively a new concept and has recently been sowed into the market. The adoption of FinTech in IFIs specifically is widespread and dispersed around the world. Furthermore, it could not be guaranteed that all Islamic firms in a region would respond to the survey that could match the proposed sample. Due to the recent development of FinTech in Islamic finance, it was necessary to keep boundaries as open as possible. This was necessary to holistically analyze FinTech’s impact on *Sharia’h* compliance. Furthermore, there is a small percentage of Islamic financial institutions that are engaged with financial technologies. To increase the chances of gaining respondents that are experts in this field, the survey was open to a wide range of countries with IFIs. The highest number of respondents belong to UAE and GCC regions, which was initially the goal of this survey. However, the number of responses from these regions was still lower than the proposed sample.

*Table 1* depicts the number of respondents categorized according to regions. It is seen that the highest number of respondents were gathered from the UAE. Being an Islamic country, it supports the data as nearly accurate and considerable.

**Table 1 Number of Respondents According to Regions**

Region	UAE	Pakistan	Indonesia	Malaysia	GCC	United states	Afghanistan	France	Russia	UK
Top Results	21	6	6	4	6	1	1	1	1	1

(Haija & Syed, 2020)

**Interview Method and Technique**

There was a total of fourteen interviews conducted with various companies listed above. The interviewees were first asked to fill out the survey and then answer the interview questions. The interview questions were framed in such a way that it should reason their survey answers. Questions were mainly experienced verification questions and company related questions. All interviewees were given the option of choosing the type of interview, whether face-to-face, phone, email, google forms or LinkedIn Interviews.

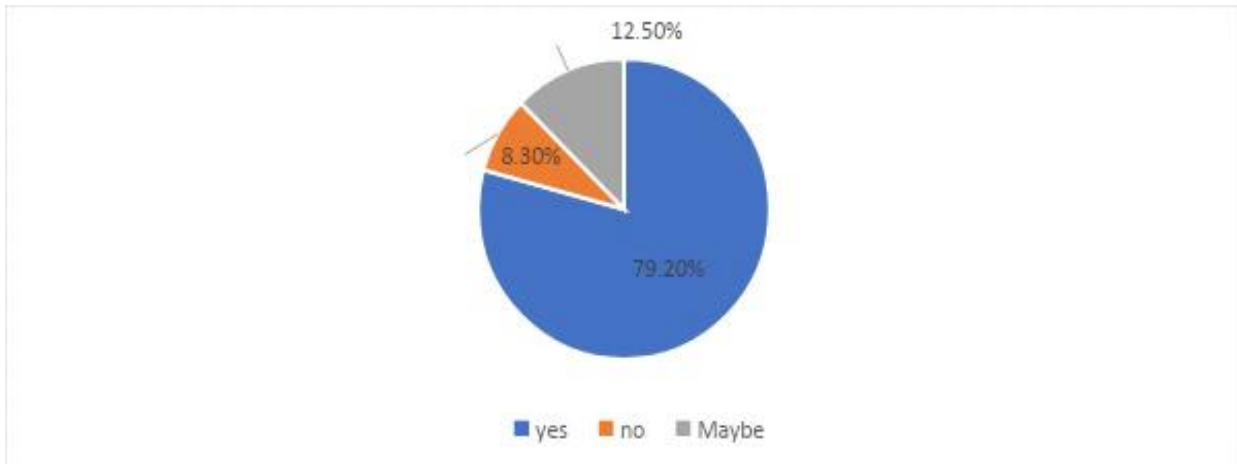
**DATA ANALYSIS**

**FinTech Applications**

*Figure 1* shows that, 79% of the respondents who work or have previously worked in IFIs acknowledged that the IFI deals with FinTech applications. The rest 21% responded that the organization does not deal with FinTech applications. Out of which 8% of the respondents are employees who either have the knowledge of Islamic FinTech and are planning to integrate in the organization or are in the process of integrating FinTech. Whereas 12% of the respondents are researchers and academic professors who have the knowledge of Islamic FinTech and qualified to be a respondent of the survey.



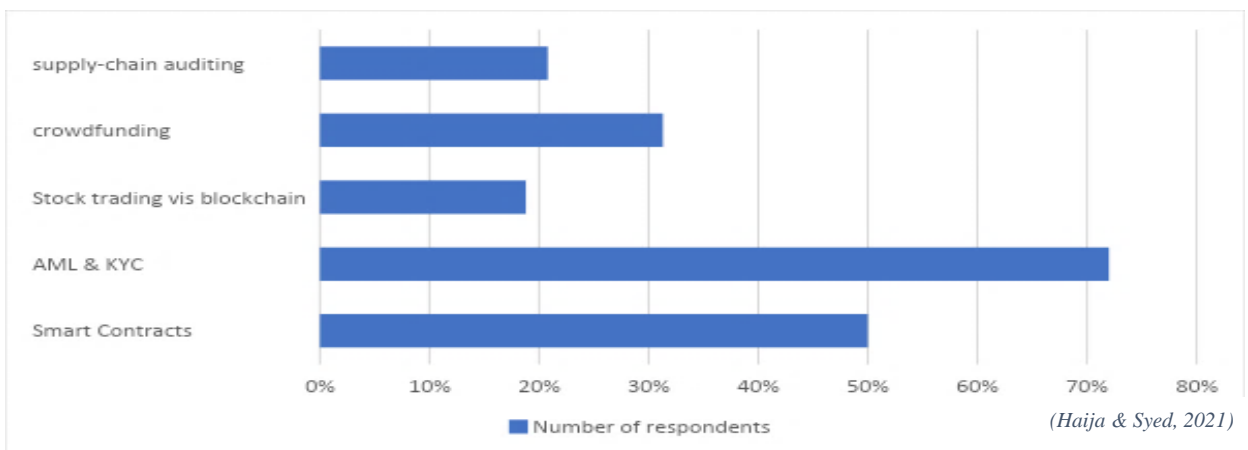
Figure 1 Number of Fintech Users



(Haija & Syed, 2021)

Majority of the organizations make use of anti-money laundering and know your customer software. AML and KYC are the core features that can facilitate in protecting and governing financial institutions. 50% of the respondents utilize smart contracts (figure 2). Smart contracts help IFIs in aligning their key financial service processes and helps them keep a clear record of transactions through block chain technology. **Table 2** represents the FinTech applications used by each organization that participated in the survey.

Figure 2 Fintech Applications Utilized by Firms



(Haija & Syed, 2021)

Table 2 FinTech applications used by various organizations according to regions

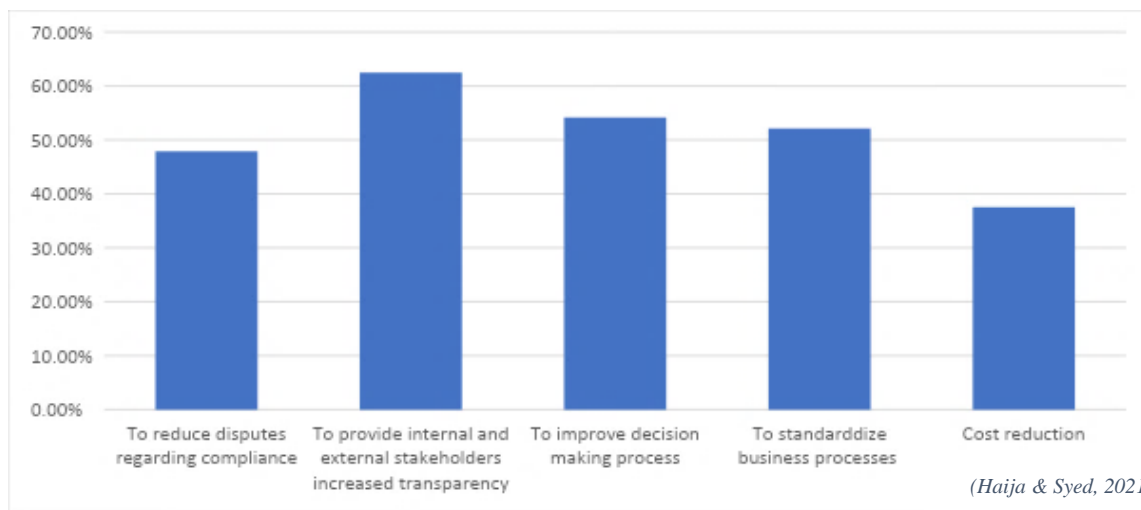
IFI	Smart Contracts	AML & KYC	Stock Trading via Blockchain	crowdfunding	Supply-chain auditing	Other	Region
570easi	√			√			France
Bsalam				√			Indonesia
Pawoon	√		√	√			Indonesia
Qazwa				√			Indonesia
MUFG Bank Berhad	√	√				Zakat Platform	Malaysia
Institute of Management sciences		√		√			Pakistan
MCB Islamic Bank Ltd		√				Zakat Platform	Pakistan
Silk Bank LTD Emaan		√	√				Pakistan

<b>Islamic Banking</b>						
<b>Sharjah Islamic Bank</b>	√					UAE
<b>Ajman Bank</b>	√					UAE
<b>ADIB</b>	√	√			√	UAE
<b>MENA FinTech Association</b>	√	√	√	√	√	UAE/MENA region
<b>Wahed Invest</b>	√	√	√	√		DMS/Saperion, Artificial Intelligence USA & UAE

(Haija & Syed, 2021)

Integrating and investing in financial technologies comes with a long-term commitment and redefining organizational objectives. Figure 3 depicts that, 62% or majority of the respondents have conveyed that their IFIs have integrated FinTech to provide internal and external stakeholders with increased transparency. Abu Dhabi Islamic Bank (ADIB) stated that confirming with transparency regulations can be very costly and time consuming. Every year a significant amount of time and expenses are incurred on hiring auditors, preparing audit reports according to the necessity of each stakeholder, reconciling all facts and figures and much more. Even after incurring all such costs, there are high risks of asymmetric information and other errors. ADIB admitted that, with the adoption of FinTech applications, all such risks and expenses are eliminated. Since all information is immutable and available in real-time, compiling audit reports with optimum transparency can be achieved with few personnel. The trust of various stakeholders has increased due to the many benefits provided by financial technologies. ADIB also reported that FinTech has additionally facilitated in reducing sharia compliance disputes and improved decision making. 54% of the respondents convey that the IFIs have integrated FinTech applications with the objective of improving the decision-making processes. About 52% of IFIs responded that business process standardization is also one of the objectives. However, all the listed objectives are interdependent on each other in one way or other. For example, if IFIs have the main objective to standardize business processes then it would mean to standardize sharia-compliance as it is one of the main functions of Islamic institutions. 47% of the IFIs integrated FinTech to improve sharia-compliance. The findings are consistent with those of Lacasse, Lambert and Khan, (2017); Dinar Standard (2018); and Teodoro (2018).

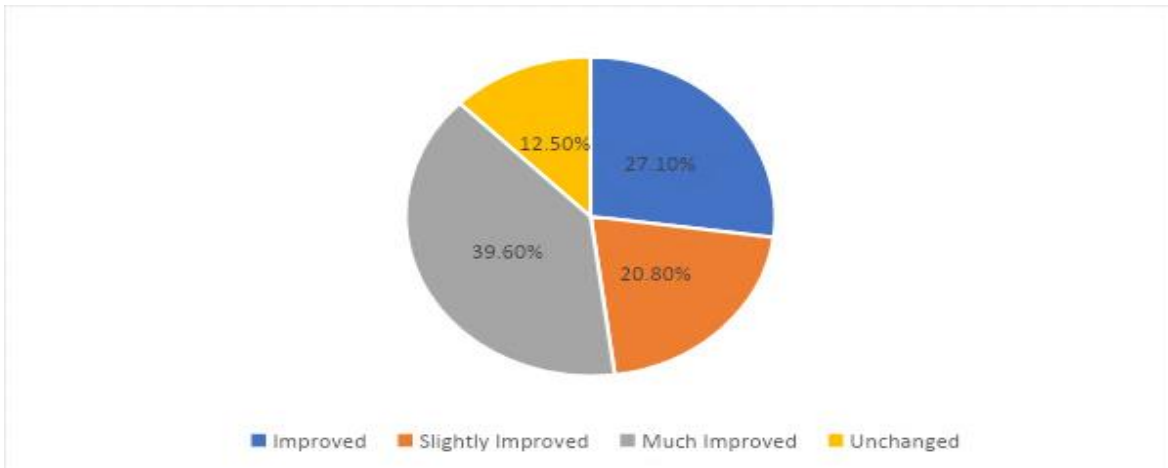
Figure 3 Objective behind integrating FinTech



**Sharia'h - Compliance**

Figure 4 shows that 39% of the respondents agree that Sharia'h-compliance has significantly improved due to the implementation of FinTech applications. 27% respondents have witnessed through their experience that FinTech has improved Sharia'h compliance by an average level. Whereas 20% respondents witnessed a slight improvement and rest of the respondents reported sharia-compliance to be unchanged. However, the key takeaway from this data is that not even one respondent/company reported Sharia'h-compliance to go worse after the implementation of financial technologies. This is mainly due to the flexibility and immutability of financial technologies using advanced programming like block chain. This result aligns with the research conducted by Adam & Bakar (2014), Ali & Mohamed (2019) and Ambala, et al. (2015). To achieve optimum Sharia'h compliance, companies must incorporate technology efficiently by considering factors such as employee resistance, cost-benefit analysis, IT infrastructure etc. According to MUFG bank berhad in Malaysia, sharia compliance is indirectly impacted by FinTech as Sharia'h compliance is based on rules set and inputs entered while programming.

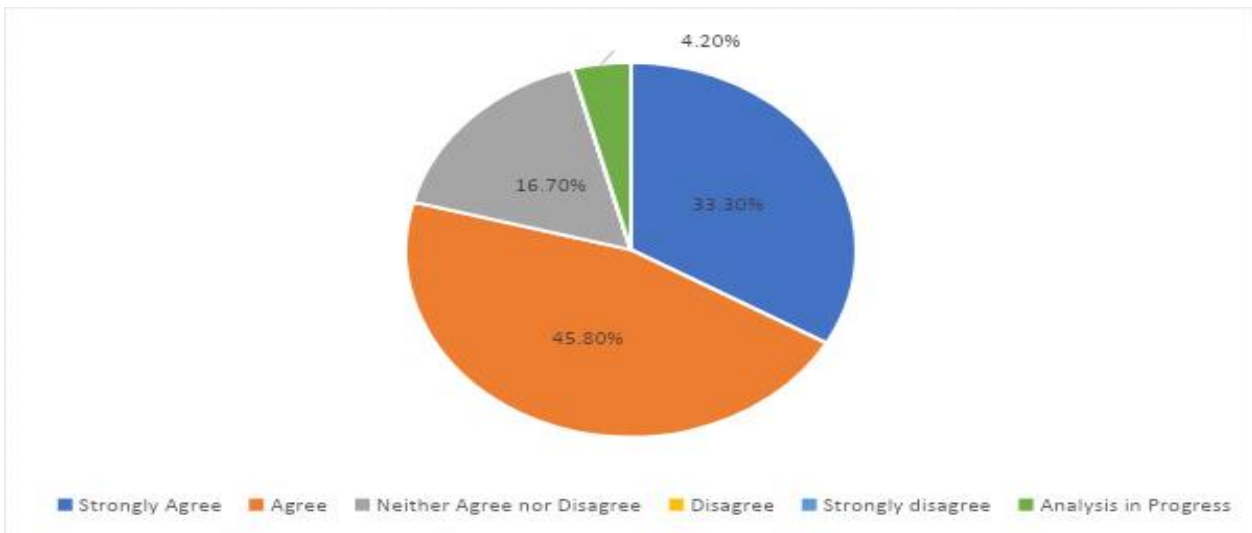
**Figure 4 Improvement of Processes due to Fintech Implementation (Sharia Compliance)**



(Haija & Syed, 2021)

Figure 5 determines the feasibility of sharia audit functions; it was asked whether FinTech applications facilitate smooth and easy sharia audit functions. In response to this, 33% of the respondents strongly agree on the fact that FinTech application do facilitate smooth sharia audit functions. Whereas 45% of the respondents agree on the same factor. Majority of respondents selecting just agree can be reasoned by stating that FinTech in the Islamic finance industry is still fresh, and evaluation of such measures is not mature. Hence respondents belonging to wahed invest, Sharjah Islamic bank and Ajman bank stated that much research and evaluation must be conducted on the existence of an impact on sharia audit functions. However, MUFG Bank Berhad stated that FinTech enables sharia auditors to have strong control over financial information and helps in defining clear liability rights and obligations. This result partly concurs with the literatures of Ali & A. (2019) and Ridhwan, et al., (2014). This difference may occur due to the differences in regions and nature of Islamic banks researched in the literatures above. All respondents either chose the strongly agree, agree, neither agree nor disagree or analysis in progress. This sample data proves that FinTech is not a cause of disadvantage to sharia auditing.

**Figure 5 Impact of Fintech on Sharia Audits**



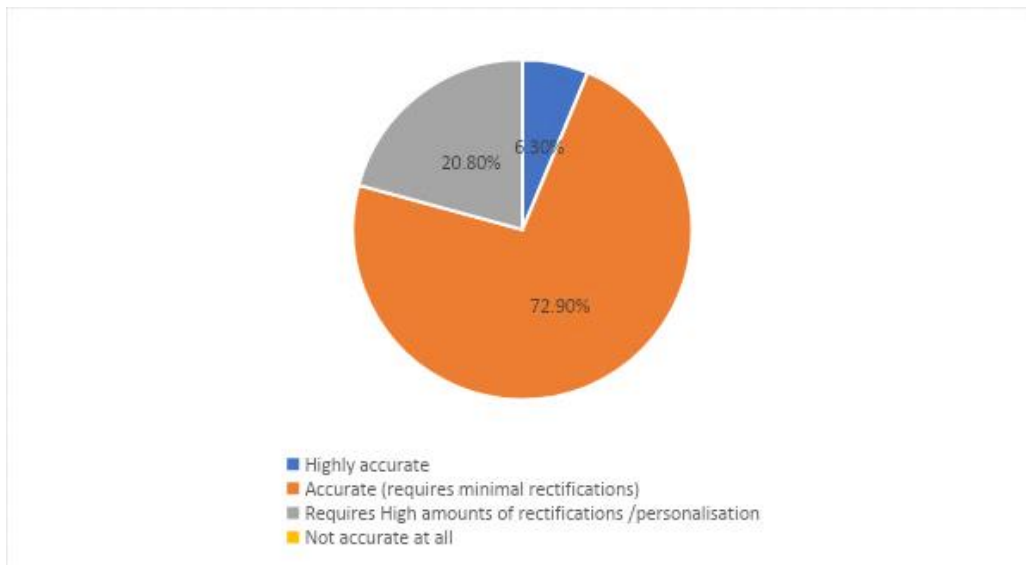
(Haija & Syed, 2021)

Figure 6 measures the degree to which FinTech applications facilitate sharia compliance. Sharia standards vary from each country and each sharia board committee. Hence, it was important to measure how accurately do the standards and fatwa set by Sharia supervisory board/ higher sharia authority (SSB/HSA) are reflected in the transactions supported by FinTech applications. Majority (79%) of the respondents' state that FinTech applications are accurate but often require minimal rectifications to match sharia standards. A minority of firms responded that FinTech application enable high accuracy of sharia compliance. The firms who acknowledge this are mature in the application of financial technologies. These firms also have a good mix of human and IT resources that are proficient in Islamic finance and technology. Among the interviewed firms, MUFG bank berhad and wahed invest are among IFIs that concur with the results. Since *Sharia'h* compliance is more subjective in nature, factors such as transaction transparency, risk-sharing, interest/gambling- free transactions and mutual consent were considered to answer the above question. 20% of the respondents have experienced that FinTech applications result in accurate sharia compliance with high



amounts of personalization. This was mainly because of the obsolete technology used and lack of investment in good personnel and IT infrastructure.

**Figure 6 Accuracy of Fintech in Sharia Compliance**



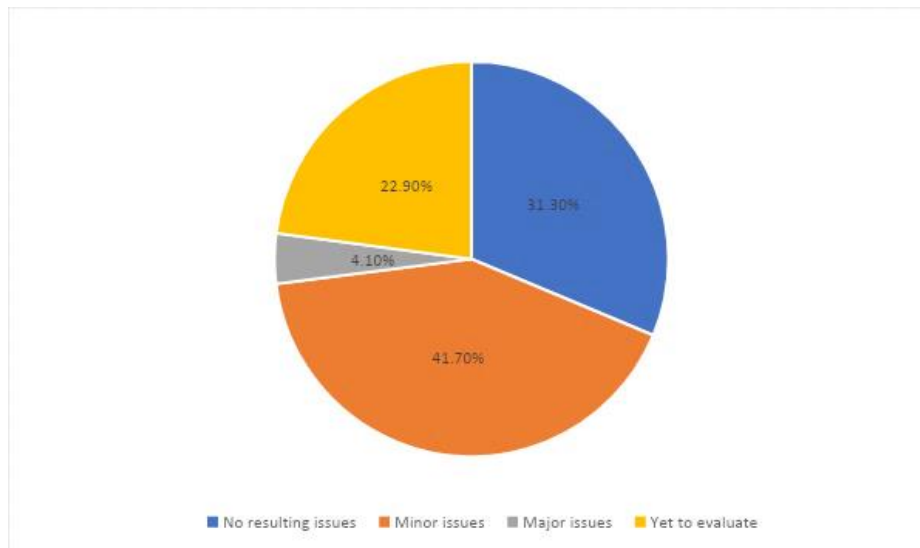
(Haija & Syed, 2021)

Majority of the respondents in *Figure 7*, evidenced through their experience at IFIs that FinTech has resulted in minor sharia violations. Most of the possible violations caused through FinTech applications is indirect methods of interest-based transactions, hidden features of gambling element, identity and financial information theft, and leakage of confidential information or trade secrets. Through interviews conducted with various IFIs and Islamic FinTech startups the reasons for these minor violations were found out which are listed below:

1. According to respondents of MENA FinTech association, FinTech applications greatly rely on the numerous other systems integrated with it. Violations usually occur due to complexities and contradictory inputs of these other integrated systems.
2. Whereas Sharjah Islamic Bank and Ajman Islamic bank convey that by incorporating AML and KYC programs, there has been a decreasing amount of sharia non-compliant activities. They reason for that due to the efficiency and effectiveness of their independent sharia audit procedures coupled with the financial technologies used.
3. MCB Bank Ltd. of Pakistan responded that integration of company systems with FinTech applications was complicated and lengthy process. During these procedures, major sharia non-compliance issues were found to occur. This was mainly due to the obsolescence of technology and inflexible systems.

Wahed Invest responded that since their systems are not integrated with even a percent of legacy-based systems, FinTech applications are accurate enough. A very insignificant percent of issues had occurred - during the beginning phases of software implementations- that resulted in sharia violation. Apart from that, according to their recent reports there were no sharia violations. This is mainly because Wahed Invest was born with the objective of establishing mature and efficient Islamic FinTech applications. Wahed invest also provides consultancy services to many other Islamic financial institutions that are seeking for optimum integration of FinTech applications. ADIB also responded similarly, Due to their specialized IT infrastructure and high investment in FinTech, they have not faced any recent issues that significantly violated sharia compliance.

Figure 7 Sharia Violation due to Fintech

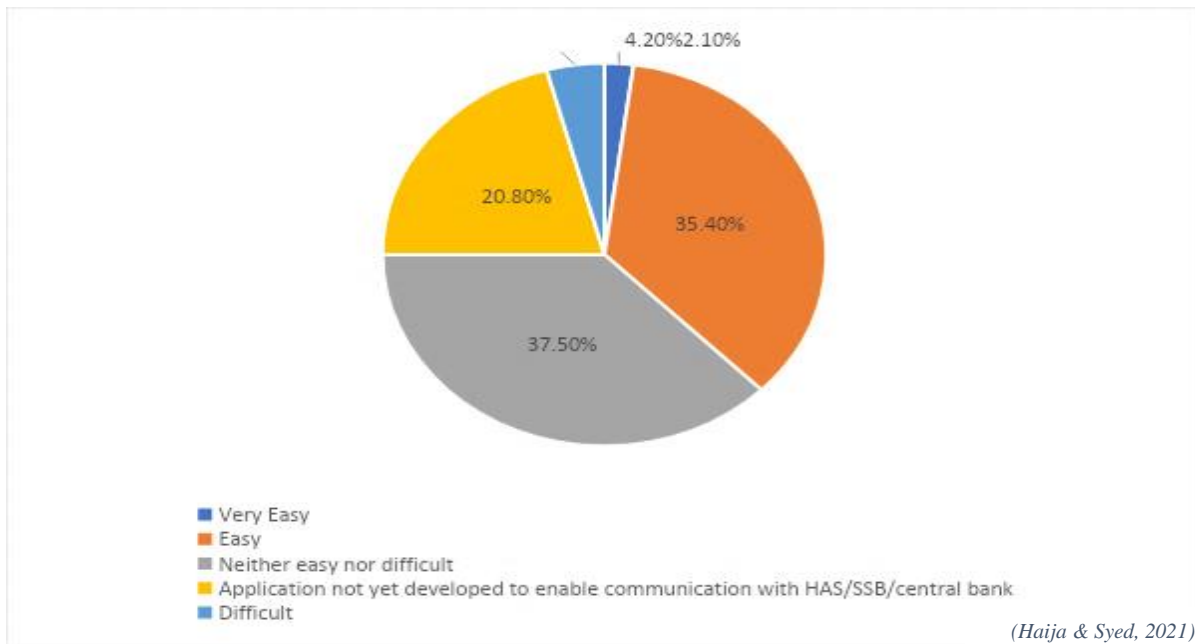


(Haija & Syed, 2021)

### Effective Decision making

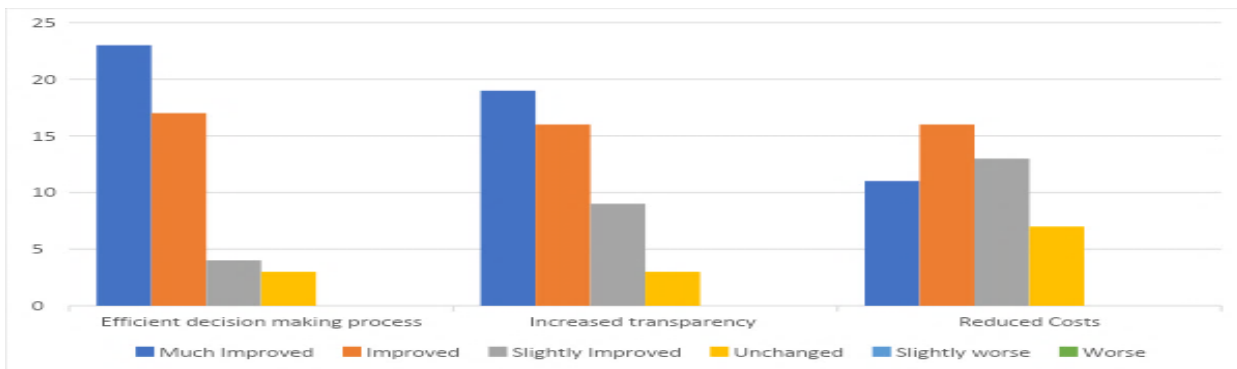
Real time communication with the regulatory authorities such as sharia supervisory board, higher sharia authority and central bank are lacking in the traditional methods. Block chain technology can give real time information to the regulatory authorities that reduces the time for decision making significantly. Referring to figure 8, about 35% of the respondents confirm that it is easy to communicate and reduces time and cost barriers involved in the decision-making process. Among this 35% of respondents were firms such as Wahed Invest, ADIB and Indonesian FinTech companies Pawoon and Qazwa. Most of the respondents (38%) convey that communication with the regulatory authorities is not significantly affected by the usage of FinTech applications. Among these 38% of respondents were Pakistan's IFIs namely, MCB Islamic Bank, Silk bank ltd. Emaan Islamic banking, and scholars from institute of management sciences. By analyzing the FinTech applications and IT infrastructure of these IFIs it can be said that due to their low level of infrastructure and low technological capabilities, they were not able to integrate their systems with the regulators. A minority of respondents evidenced it was difficult to communicate with regulators through FinTech integration. This was due to the complex systems and legacy-based technologies used by these organizations. 21% of the respondents confirmed that their firms' have not yet integrated FinTech applications with the systems of regulatory authorities. These organizations still use the traditional methods of communication with Sharia supervisory board (SSB) which takes more time in the decision-making processes. Communication with supervisory authorities is a major factor influencing the decision-making process of an organization.

Figure 8 Impact of Fintech on communication of decisions



Traditionally, IFIs have reported long wait times for approvals from SSB/Central Bank which has led to low customer satisfaction levels and/or customers approaching conventional financial institutions. With the usage of FinTech applications based on block chain technology, various decision engines can be integrated that can lead to a significantly lower decision-making cycle time. However, this finding was not found in any literatures reviewed or other relevant research papers.

Figure 9 Impact of Fintech on Decision Making Process

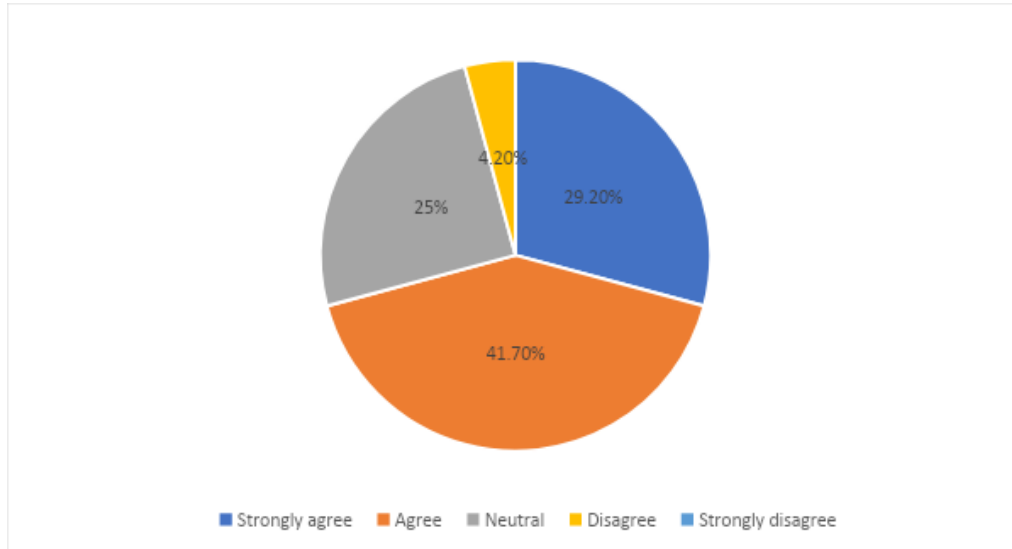


According to majority of the respondents, integrating FinTech applications has significantly improved their decision-making processes (figure 9). Whereas other respondents replied that decision making processes are either improved, slightly improved or have no impact at all. The key takeaway from this finding is that none of the respondents or firms acknowledged that FinTech has worsened the decision-making processes in any shape or form. Transparency and costs are factors that determine whether decision making has improved or not. Again, majority of the respondents have witnessed that FinTech applications has significantly improved the level of transparency in the organization. If there is increased transparency, then decisions can be taken quickly as there is all information provided at real-time with holistic reports that can be downloaded at any time. This finding concurs with the research conducted by Satpute & Das (2019), Vives (2017) and Huber (1990). Although both research are directed towards the conventional sector, the decision-making findings are similar. Furthermore, the decision-making technology component of conventional does not contradict with the policies of Islamic financial institutions. Hence, these literatures can be used as a basis.

Majority of the respondents agree that FinTech applications enables efficient decision making by the senior management. Most of the times, the senior management levels are unaware of the daily operations and get reports only by the end of every month. ADIB responded that, this process took a long time for senior manager to make decisions and even longer to implement them which leads to backlog of a lot of work. This ultimately leads to lower levels of customer satisfaction and low productivity levels. ADIB reported that after implementation of various financial technologies and efficiently integrating them with bank's operating

software, senior management decisions are communicated to all departments in real-time with minimum discrepancies. According to Figure 10, 29% of the respondents strongly agree that FinTech applications has increased efficiency of decisions made by senior management. These respondents have experienced a significant positive impact on the decision-making processes. According to the MENA FinTech association, financial technologies coupled with decision engines can not only reduce the time and cost spent on making best decisions but also improve the quality of decisions made by testing each alternative and its possible impact on the organization. A French based Islamic FinTech company, 570easi, when interviewed responded that their senior management decision making efficiency has significantly improved by integrating latest financial technologies.

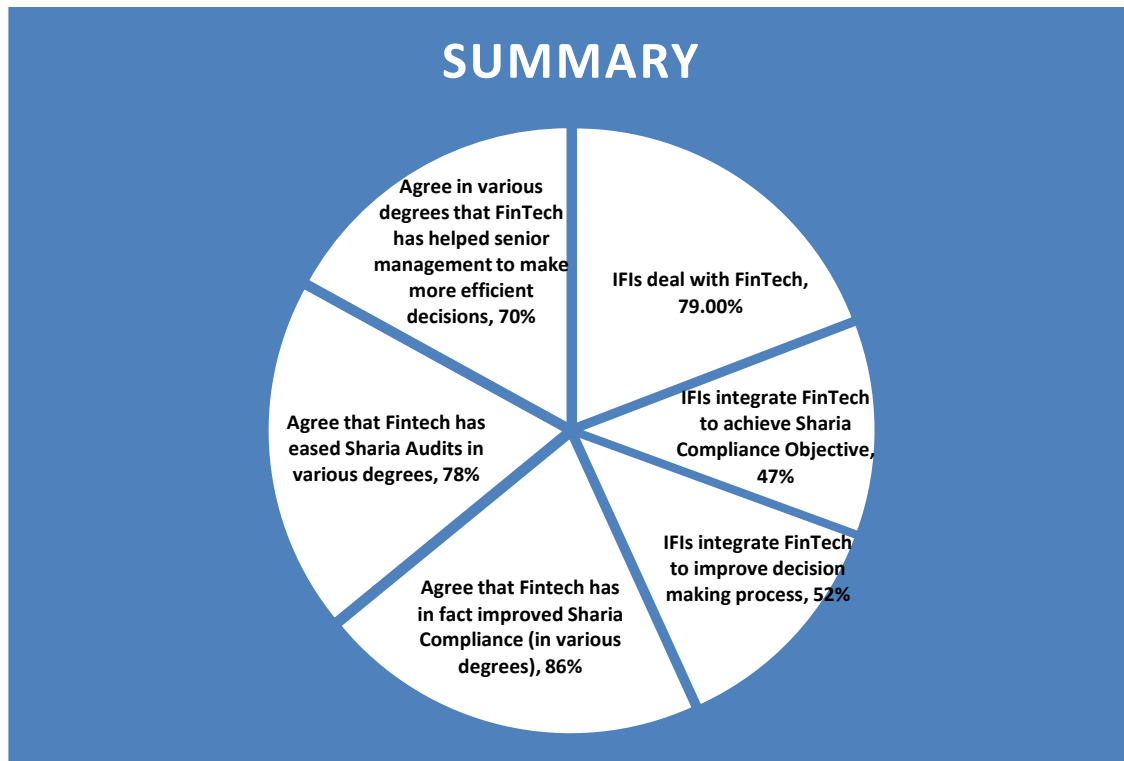
**Figure 10 Impact of FinTech on Decisions Made by Senior Management**



(Haija & Syed, 2021)

## RESULTS AND FINDINGS

It was found that the main objective behind integrating FinTech applications in IFIs was to provide better transparency to internal and external stakeholders. This was followed by decision making, business process standardization and sharia compliance. These results are the key to the problem statement that was portrayed at the start of this research. However, all these factors are highly interrelated with each other. A high number of IFIs also utilize the AML and KYC related financial technologies as these are core to defining liabilities and monitoring procedures. Smart contracts, crowdfunding and other applications are rapidly rising in demand and have shown greater performance and efficiency levels of IFIs. The data collected identified that the impact of FinTech on sharia compliance is mostly positive, however the industry still must go through major developments. Whereas decision making efficiency due to FinTech applications was also found to be positive as this component is not as complex as sharia compliance. Additionally, decision making engines are uniform for conventional institutions and well as IFIs. The findings proved that there is a rapid growth of FinTech and a subsequent demand for workforce with such skills. Another major finding was that incorporating FinTech resulted on a positive impact on the reduction of costs in terms of time and money used. These results are unique as two most crucial elements of IFIs were researched in association to Fintech. These results concur in one way or the other with that of Utami, Basrowi and Julianas (2019) and Satpute and Das (2019). These researchers brought out the conventional parts of Fintech Study, whereas this paper researched on the Islamic financial sector which is one of the most advancing industries.



### CONCLUSION AND RECOMMENDATIONS

Financial technologies have proven to be greatly compatible with the concepts of Islamic financial institutions. This is mainly because technologies are objective and do not produce biased results. Initially the problem statement was the occurrence of contradictions and delays in Sharia compliance as there are many subjective points. But after conducting this research we understand that this problem can be resolved with FinTech applications by using the right human resources, skills and techniques. However, the main FinTech platforms are aimed towards serving the needs of conventional financial intermediaries. For this reason, there is a rapid increase in the establishment FinTech in Islamic finance. These companies are aimed at developing programs and software that can be optimally used for Islamic financing purposes. *Sharia*'h-compliance and decision-making processes are one of the key main functions of IFIs that is still lacking. With the integration of FinTech, it is being witnessed that these processes are being improved significantly which is ultimately having a positive impact on the rest of the organizational objectives. Through this research it was proved that there is a significantly positive impact of FinTech on IFIs' sharia-compliance and decision-making efficiency. The research met all the proposed objectives to the extent of information collected. There were only a few exceptions that showed a negative impact of FinTech on IFIs. For instance, according to the survey conducted, 4.2% of the respondents concurred that utilization of FinTech led to major violation in sharia compliance. Furthermore, 22.9% of respondents are yet to evaluate the efficiency of FinTech applications in Islamic finance, such exceptions occurred mostly due to country's demographics, lack of infrastructure, experimental project failures, low investment motives and/or lack of skills. To successfully penetrate a mature usage of financial technologies in the Islamic finance industry, following recommendations must be taken into consideration. Firstly, IFIs must redefine their organizational objectives that are flexible with FinTech. Secondly, firms must consider that, although FinTech integration involves high expenses, it can also prove to be highly profitable in the future. Thirdly, if IFIs identify lack of skilled IT personnel, they must outsource or contract with relevant consultancies. Fourthly, to have optimum FinTech operations, IFIs must have a balanced mix of sharia-skilled personnel and IT personnel. Lastly, FinTech applications must be integrated with decision engines to generate and test optimum alternatives. However, there is a rapid increase of research and development happening in this field. IFIs and its various stakeholders have high hopes of FinTech revolutionizing the operations of Islamic financial intermediaries. One of the major limitations to this study was cost barrier, to survey a large amount of companies, separate budgets were required to get accurate information. This explains the limited number of survey responses. Moreover, it is advised that future research be conducted on the technical aspect of *Sharia*'h compliance in Fintech and how accurate it is.

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**Appendix**

**Sample Survey**

Q1: Does the IFI deal with FinTech?

Q2: Select various applications used by the organization.

Q3: Rate the processes that have been improved due to the implementation of the above technology.

Q4: What is IFI's objective for integrating FinTech?

Q5: Does FinTech facilitate smooth and easy sharia audit functions?

Q6: How accurate is FinTech in facilitating sharia compliance?

Q7: Has there been an issue where FinTech resulted in violation of sharia?

Q8: How easy is it to communicate decisions and other sharia related aspects with the sharia supervisory boards and central bank through FinTech?

Q9: Has FinTech proved to be successful in allowing senior management to make decisions that are effective and efficient?

Q10: What solutions do you think FinTech can bring to IFIs that has not been accomplished by traditional methods?

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