Int. Journal of
Financial Technology Perspevtive (Fin Tech)
Vol.2, No.3, Winter 2025

Smart contract in Islamic banking

Fatemeh Pouraskari Jourshari
PhD in Finance-Financial Engineering

Submit: 12/10/2020 Accept: 05/12/2020

Abstract

smart contract is a disruptive technology and gaining market share at a rapid pace. The main purpose of smart contract is to facilitate the transfer of digital assets between the contracting parties based on pre-agreed stipulations or terms. The concept of smart contracts makes enormous sense to Islamic financial institutions to implement it for Islamic financing services. A smart contract is closer to Islamic contract and in compliance with Shariah objective to ensure transparency in business dealings or transactions such as asset definition, payment terms, enforcement and following the principle of trust. In this research, smart contracts, the main characteristics of smart contracts and the application of smart contracts in various industries are presented. On the other hand, the traditional models of Murabaha base purchase housing were described. Also, a proposed smart contract for the creation of Islamic housing and a proposed smart contract, as well as its various designs for the fintech of Islamic banking were presented.

Keywords

Smart Contract, Murabaha, Islamic Banking, Blockchain.

1. Introduction

Fintech is defined as financial technology. As the financial industry moving toward modernism and globalization, technology is inevitable. The technology in finance has changing the banking behaviour of stakeholders in doing financial transaction. Financial technology has started with the evolution of Internet since 1990s which it implicates the lower cost of doing transaction (Lee and Shin, 2018). The emergence of internet and smart phone has accelerate the banking process and expedite the financial transaction. This change has evolve into new whole industry from traditional banking of brick-and-mortar to the new system in doing financial transaction called Fintech. Hence, it is considered disruptive technology, which means disrupt or complete changes the way to do things. This also means, consumer will no longer go to traditional banks to do their financial matters, rather they do it by apps and mobile. According to Lee (2017), Fintech is divided into two-traditional and emergent Fintech. Traditional Fintech is market players serve as facilitators, while emergent Fintech is rather a disruptor to the existing market. The first is considered to facilitate and supporting the existing financial industry, while the latter is deemed as innovator to the industry. Zovolokina, Dolata and Schwabe (2016) mentioned that Fintech is not a phenomena affecting entrepreneur, rather it is influenced by the combination of economic, technological factor and regulation.

The market of Fintech is lucratively attractive and potential for handsome profit. Surendra (2017) reported that estimation of investment in Fintech globally reaching up to USD 40 billion. Although it is reported that the users of Fintech globally is still small, as it is now in nascent stage, the report from Ernst & Young (2016) has shows that the growth rate of adoption is fast up to three times. Currently, the adoption index of Fintech globally is 15.5 percent and it is estimated can be tripled within a year, provided there are awareness on the adoption. This is quite fast compared to the report in 2016 by International Trade Adiministration (ITA) from US Department of Commerce which stated that the adoption rate can double within a year (ITA, 2016). In Indonesia, the transaction value via Fintech in 2016 is worth RPI 199 trillion (Dwi Marlina & Alex, 2017). In the case of Malaysia, Fintech in Malaysia is still in infancy stage but growing rapidly. Securities Commission (SC) is the first fintech regulator in ASEAN. SC has amended the Guidelines for Recognized Market, as part of regulatory framework for P2P lending, allowing small and medium-sized companies access for debt funding (Surendra, 2017). Minister of Finance II (year 2016-2018), Dato' Seri Johari Abdul Ghani has mentioned in Malaysia Fintech Expo 2018 that government of Malaysia will guarante the condusive economic environment to support the Fintech industry to ensure no glitch in the digital business (Hazwan Faisal, 2018). He also reporting that digital economy has contribute to the Gross Domestic Product (GDP) about 17.8 percent in 2016 and estimated to reach 20 percent in 2020.

Islamic Fintech is one of the innovation in Fintech. Some reports separate Islamic Fintech as one of the business model in Fintech and some reports put Islamic Fintech as similar like any other Fintech, except that the business model of Islamic Fintech following Shariah guidelines. They are also known as Shariah-compliant Fintech, Shariah Fintech, or Halal Fintech which are all bring the similar meaning. Basically, Islamic Fintech carry the same jurisdiction as products in Islamic finance; which must be free from '*Maghrib*' elements; *maysir* (gambling), *gharar* (uncertainty) and *riba* (interest) (Muthiah, et al., 2017).

Although it is notable that Islamic Fintech is still positioning themselves around the world, its starts-up are growing tremendously all around the world, particularly in Muslim-majority countries like Malaysia, Indonesia, and United Arab Emirates. Surprisingly, non-Muslim countries like US and UK also have some numbers in this profitable digital business as reported by IFNFintech, RedMoney (2018). Kenya and Switzerland also venturing in Islamic Fintech recently. This is because consumer, especially Muslim consumers and religious-minded

person, aware of the financial technology and want to deal with it with faith.

However, Todorof (2018) argued that Islamic Fintech is somehow left behind and losing the huge populations of Muslim consumers. This is because the adherence to Shariah principles is strong which somehow make it quite strict to acquire wealth. This is because in Shariah point of view, wealth should be acquired by risk and labor. However, Todorof (2018) also positively mentioned that technology can accelerate the economies of Muslims particularly in Fintech industry, especially in P2P, remittance, crowfunding and mobile wallet. This can be done by having harmonization of standards and guidelines to minimize the risk. Despite the position of Islamic Fintech is still in infancy stage, its market will be robust and wider. This is because Islamic Fintech not only offers efficiency in mobile banking and low transaction cost, but also provide transparency and flexibility, which are vital elements in Shariah guidelines and *Maqasid al-Shariah* (objectives of Shariah).

Thus, this research, the concept of intelligent contract, Islamic banking agreement and the traditional Islamic housing facility model has been addressed, and ultimately, an intelligent contract for Islamic housing facilities and a proposed intelligent contract model for Finn Islamic Banking has been provided. The main question in this research is how is the smart contract in Islamic banking?

The subject is important as smart conract is no longer a hype but a reality (Capegemini Consulting, 2016). It is so because smart contract able to overcome the problems in traditional contract (Capegemini Consulting, 2016). Furthermore, people nowadays are techno-literate and prefer less human interaction when dealing with financial transaction (Siti Rohaya et al., 2018; Nurul Aini & Ainulashikin, 2018).

2. Smart Contract

Smart contract was first introduced by Nick Szabo in 1994. However, the information technology infrastructure at that time was not ready. Smart contract is defined as "a set of promise, specified in digital form, including protocols within which the parties perform on these promises" (Lauslahti, Mattila & Seppälä, 2017; Idelberger, Governatori, Riveret & Sartor, 2016). According to Szabo (1997), smart contract able to facilitate financial services and products such as loans intallments and credit card. The application of smart contract is not only for financial services such as banking and insurance, it also vastly applicable for energy, e-government, telecommunication, education, art and many more.

According to Laldin (n.d.), smart contract is more generic than traditional contract. The objectives of smart contract are to meet the conditions of common contract and to minimize the need for intermediaries. It also intended to reduce fraud loss and to lower arbitration and transaction cost (Laldin, n.d.; Siti Rohaya et al., 2018). Smart contract also needed to speed up the transaction process and to maximize transparency.

Smart contract was described by Siti Rohaya et al., (2018) have few stages that efficiently applied in financial technologies. The pre-defined smart contract set the specific terms and standards which the parties involved adhere. This will execute the smart contract which the informations are exchanged and the transaction take place. Digital asset can be traded via cryptocurrencies such as Bitcoin or Ethereum but for physical asset, the smart contracts require stocks or fiat money. The use of artifical intelligence (Ai) is applied in smart contract, which is widely applied in customer services, product sales and financial transaction.

Smart contracts are also known as intelligent contract, digital contract or crypto contracts, and they digitally execute the contract based on pre-defined terms without any manual intervention. All obligations are enforced and executed electronically. It is a self-executing contract based on the predefined scenario, which eliminates the need for a middleman and automates the processing of trust. Smart contract overview is depicted in Fig 1. The main purpose of smart contract is to facilitate the transfer of digital assets between the contracting parties based on pre-

agreed stipulations or terms. Similar to the traditional contract, it defined the rules and penalties in the form of software codes similar to if-then-else statement to enforce the agreed-upon obligations automatically. These contracts are selfenforcing in nature and can execute tasks and function without manual intervention. It is smart indeed, which automates the repetitive manual and duplicate tasks. It allows the performance of credible transactions with minimal reliance on third parties(Alam,2019).

minimal reliance on third parties. The key features of smart contracts are listed below Source(Alam ,2019):

Self-executable: Smart contracts use software code to automate tasks like if-then-else to simplify the complex scenario. It can increase the speed in execution of a wide variety of business processes and contractual terms, which are at present processed manually.

Automated: All terms in agreements are automated or with limited manual intervention. It makes the business deals and transactions less prone to manual error due to the blockchain technology and automation involved.

Tamper proof: The smart contracts are processed automatically over the decentralized blockchain network instead of centralized database. This makes deals or transactions immutable and no one can modify or manipulate the details without consensus.

Minimum reliance on intermediaries: Terms of smart contract are executed without relying or with minimum reliance on third-party intermediary such as lawyers and judges for executing a deal. Smart contracts are driven by "trust" services similar to traditional escrow arrangement between counterparties, which were conventionally executed using lawyers or judicial systems.

Cost effective: There is a minimum reliance on intermediaries and automation which leads to reduction in costs. The cost savings can be seen in legal expenses, financial payment processing, minimum operation cost and also due to no more paper-backed processes.

Simplified contracts: Smart contracts can be easily simplified with simple line of codes following "if-then-else" statement, which won't require legal expertise. Traditional contracts are lengthy and content driven with numerous conditions for protecting both parties' rights , that is, conditions in the event either party fails to honour their obligations.

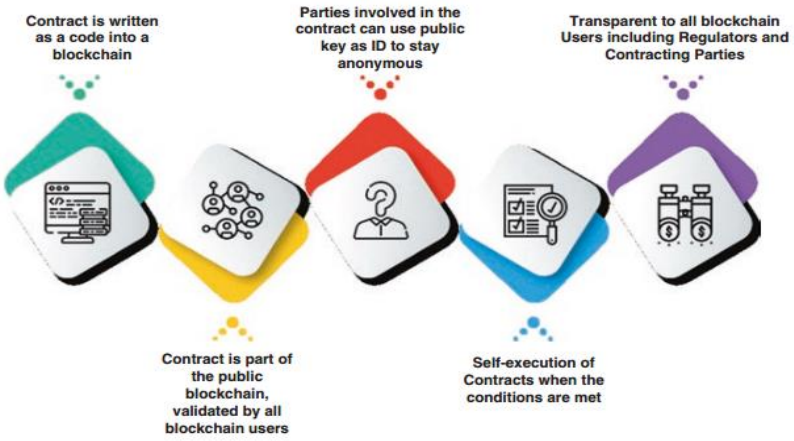

Fig 1. Smart contract overview. Source: Alam (2019)

The foundation of smart contracts is based on blockchain technology, which is autonomous, highly secured and immutable. The blockchain technology also allows the visibility of contract not only to the contracting parties but also to users depending on the type of blockchain technology , that is, "public", "private" or "hybrid". All contracts processed over blockchain are executed and accepted over nodes, that is, network of computers that used consensus protocol to add the contract to the blockchain. Industries such as health care, banking, real estate, insurance and countless other industries are in the process of implementing smart contracts, to reap the benefits it has to offer. Application of smart contracts in different sectors can be seen in Fig 2.

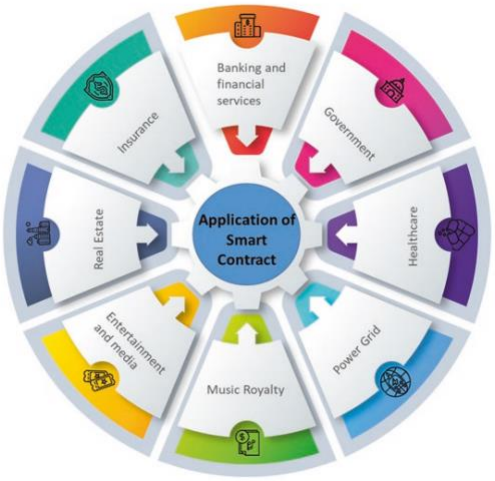

Fig 2.Application of smart contract.Source: Alam (2019)

Vending machine is one of offer-acceptance mechanism where the "creator" of smart contract put pre-conditioned in the distribution of asset. When the terms and conditions in the smart contract are met, the contract will executed itself automatically (Lauslahti et al., 2017; Zerado & Fintech Network, 2017; Siti Rohaya et al., 2018).

Figure (3) shows the system in smart contract. Each contract will have 20 bytes of unique address. Once the smart contract is positioned into the blockchain, the contract algorithm cannot be changed. Users will send a transaction to the contract's address and it will be executed by miners network to reach a consensus of its yield. The contract's state then will be updated accordingly. The contract able to read or write its private storage, store money into its account balance and send or receive messages, send and receives money from user or other contracts, based on the transaction it receives (Alharby & Moorsel, 2017).

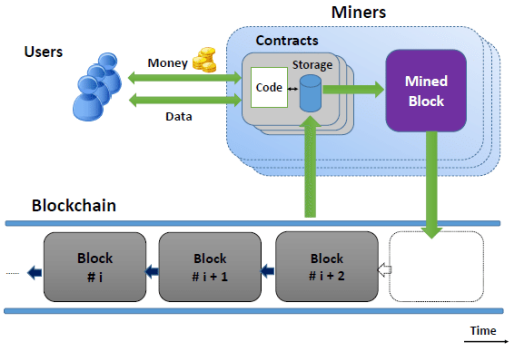

Figure 3: Smart Contract System. Source: Alharby & Moorsel (2017).

3. How Smart Contract Working?

In a brief explanation, smart contract is created between two users. Then the terms and conditions of the contract is written as code. The smart contract then is placed in blockchain and after that the smart contract will execute itself upon the triggering event. Lauslahti (et al., 2017) had mentioned that the most simplest form of smart contract is vending machine.

4. Advantage of smart contract compared to traditional contract

Smart contract is claimed to have advantage in efficiency, security and impartiality in the agreement execution. Thus, it can lower the transaction cost and improving confidence and confidentiality between parties involved (Idelberger, Governatori, Riveret & Sartor, 2016). Traditional contracts on the other hand

created by legal professional, which mostly contrain legal language. The public have hard time in deciphering the legal language which slowing down the transaction. Traditional contract also have too many printed documents and risk of losing it is high. This jeorpardize the safety and confidentiality of the transaction. It also heavily depend on the third parties for enforcement and if things go wrong, the parties involved need to rely on the public judicial system (Laldin, n.d). The data gathered by Capegemini Consulting (2016) has shows that traditional contract is exposed to the risk of fraud, overhead, and settlement delay. It was reported that average settlement days for loan in US is 20+ days while in Europe around 48 days. The same report also shows that £277 billion per day volume handled by UK's RTGS (Real-time-gross-settlement) system that went offline for 10 hours in 2014, delaying deals worth billions.

As mentioned previously, the smart contract can solve the problems in traditional contract. Smart contract is created by programmers where it is digitally written using programming code. It has pre-defined rule and consequences by stating obligations, benefits and penalties. It also reduce the potential of litigation and have auditable history of transaction. This is because the smart contracts has fully-digitalized the contracts. The report from Capegemini Consulting (201X) has indicated that by applying smart contract in loan market, the banks can generate extra income from fee around US 2-7 billion annually. In motor insurance service, insurers can save money because of the lower cost of settlement around US $21 billion annually. In customers' side, the loan is taking less day, lower processing fee and lower insurance premium.

Figure 4 below shows the features that differentiate traditional contracts and smart contracts. From the figure we can infer that smart contracts is the better option compared to traditional contracts.

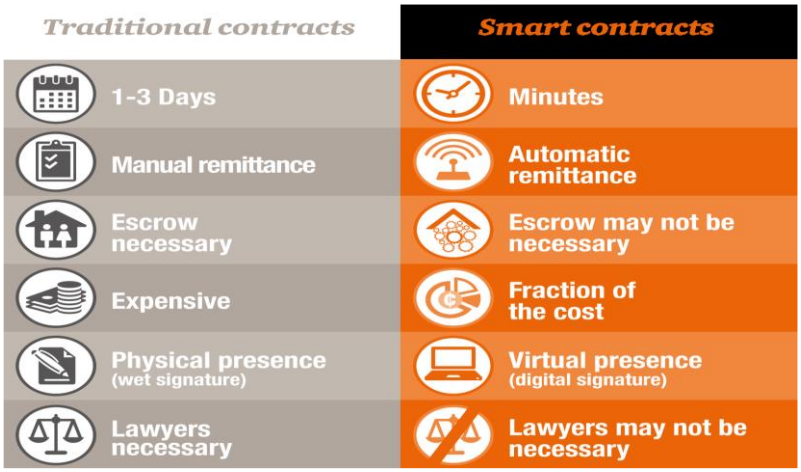

Figure 4: Differences between Traditional Contract and Smart Contract. Source: Laldin (n.d.)

5. Smart contract in Islamic Fintech

Smart contract is expected to to accelerate the digitalization of Islamic banking industry in Islamic capital market, Islamic investment, takaful and Islamic banking. Malaysia is so optimist on this that Malaysian Digital Economy Corp (MDEC) is launching Islamic Digital Framework that was formulated by Department of Islamic Development, Malaysia (JAKIM) and Amanie Advisors Sdn Bhd, which was lead by the prominent scholars of Islamic finance, Datuk Dr Daud Bakar. Similarly, Dubai also has launched Fintech

Hive with aim to become the global hub of Islamic Fintech revolution.

Currently, smart contract is under scrutinization of laws and regulations. Capegemini Consulting (2016) has reported that year 2017-2018 are the year of take-off. Most of current studies has stated that blockchain technology is currently uses smart contract. It is so because blockchain is the ideal platform for smart contract due to its technology security and immutability (Shariyah Review Bureau, 2018; Alharby & Moorsel, 2017). The study of smart contract and blockchain however is limited because the industry is still in infancy stage. Furthermore, the regulators and legal scholars are cautious about this new technology. Currently, the legal status about smart contract in blockchain is regulated and influenced by state law (Lauslahti, et al., 2017).

According to Siti Rohaya et al., (2018), smart contract could support Islamic finance product. The terms and conditions in smart contract should be specific and must be executed within Shariah guidelines. According to Shariah Review Bureau (2018), smart contract make the Sukuk (Shariah-compliant bond) based on blockchain possible. It also can be applied to other Islamic financial product such as Takaful, crowdfunding and microfinance models. However the Bureau mentioned that the smart contract on blockchain must be differ from each other accordingly. Dadabhoy (2018) has mentioned that smart contract can be adopted possible automation in Islamic finance, Murabahah contract, collateralised Murabahah, Wakalah and Tahawwut Master Agreement.

According to Laldin (n.d.) smart contract in Fintech is considered *Maslahah* (public interest). This is because smart contract and Fintech is facilitating to the goodness of well-being. It provides good order of life and contribute to the civilization of mankind. Indirectly, it serve the objective of Shariah (*Maqasid-al-Shariah*). However, smart contract in Fintech should be in line with Shariah principles as guided by main sources of revelation i.e. *Quran, Sunnah, Ijma'* (consensus of scholars) and *Qiyas* (analogy).

However, the framework of smart contract in Fintech to be Shariah-compliant still in debate (Djafri, 2017; IRCIEF, 2018; Islamic Business & Finance; 2017). This is because the discussion on blockchain is still on-going as it is a new technology emerged to the public. Furthermore, blockchain is closely intertwined with cryptocurrency which currently under scrutinization of regulators, financial players, academicians and scholars. The complexities of the blockchain and smart contract, although proved to be more secure and sound, is also exposed to the risk similar as traditional financial risk. Smart contract also exposed to the fraud risk, issue of decentralization, market risk, human-nature elements outside of the contract, systemic risk, jusrisdiction issue, programmatic risk and many more (Laldin, n.d; Delmolino, Arnett, Kosba, Miller & Shi, 2015).

6. Islamic Banking Contract

The banking sector is witnessing a dramatic change, especially in the age of electronic transactions, and faces various competitive forces, including product development in order to meet the current needs of business and trade. Islamic banking is no exception. After decades of operation, the transactions of Islamic banking seem to depend on only a handful of financial products. Islamic investors have, considerably fewer investment outlets and choices. It thus becomes necessary that Muslim scholars adopt, sooner rather than later, a creative approach toward exploring various effective banking products from the fiqh1 literature that may further strengthen Islamic banks and secure financial returns for their clients (Arbouna, 2007).

Contracts in Islamic law are divided into several categories with regard to the purpose for which the contracts are entered into. Each category differs from another mainly in relation to the purpose intended by the Law giver resulting in different Shari'ah effects of the contracts, such as the transfer of ownership, risk-taking, and proft distribution. In fact, the basic conditions and requirements of the contracts also differ from one another due to differences in the purpose and nature of the contracts. Hence, these classifcations

are signifcant when determining the rules and conditions that must be completely met to make the contracts valid and enforceable, and in turn, allow all the Shari'ah effects of the contract to take place.The contracts applied in the Islamic banking and fnance industry can be mainly classifed as follows: exchange-based contracts, contracts of partnership, agency contracts, charitable contracts, contracts of security, and supporting contracts and instruments (Alam, 2021).

7. Murabaḥah

al-Murābaḥah(Mark-up Sale): defned by AAOIFI Shari'ah Standard no. 8 as selling a commodity as per the purchasing price with a defned and agreed-upon proft mark-up. It may be contracted either on a cash basis or a deferred payment basis(AAOIFI, 2015). The word murābaḥah comes from the Arabic verb, rābaḥa, yurābiḥu ,murābaḥatan. The original verb is from fi 'il thulāthi is rabaḥa. In the dictionary of Lisān al-Arab, the words al-ribḥu, al-rabaḥu and al-rabbaḥu carry the same meaning of growth or growth in commerce (Ibn Manẓūr 1954). Whereas Ibn al-'Arabī states al-ribḥu and al-rabaḥu meaning profit in commerce. That takrifan combination brings to the notion al-ribḥ as an advantage of capital turnover generated through employment ,trade and individual and collective transactions (Maulidizen 2016).

8. Traditional Islamic Home Financing Product

Based on AAOIFI Shari'ah Standard no. 8, 2017, MTPO has the following four steps as shown in Fig. 4.1: (1b) Signing binding letter of undertaking, (2a and 2b) purchase and ownership of the asset, (3) sale of the asset, and follow-up on the instalment payment. From Fig. 5 the following are the operational steps of MTPO(Alam,2021):

1) The customer obtains price quotation and specifcations of the house from the developer (1a) and submits the quotation and the house specifcations to the Islamic bank (1b) and signs a binding letter of undertaking that he will purchase the house should the bank buy it from the developer.
2) The Islamic bank pays the price of purchasing the house (2a) to the developer and owns it (2b).
3) The Islamic bank sells the house to the customer based on alMurabahahsale and then monitors the deferred payment by the customer.

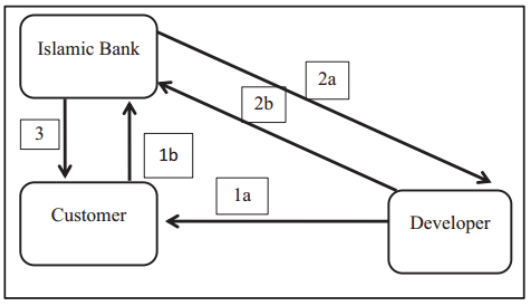

Fig 5. Murabahahto the purchase orderer home fnancing contracts Source:Alam (2021).

9. Proposed Smart Contract for Islamic Home Financing

Based on the traditional contract explained earlier the authors have constructed the smart contract for the Islamic banking FinTech taking home fnancing as a case. Nienhaus (2017), citing Evry (2016, 10), provides fve steps that involve the use of Blockchain technology for the smart contract:

(1) transaction defnition, (2) transaction authentication, (3) block creation, (4) block validation, and (5) block chaining. These fve steps are depicted in Fig 6 In the frst step, contracting parties create messages that contain valuable information related to the nature of the contract, the asset involved , the address of the sender and the terms and conditions including the price and mode of payment. Messages are communicated to the contracting parties through the Blockchain network. Contracting parties enter into a computerized transaction protocol that automatically

executes a contract once the predetermined conditions are met.

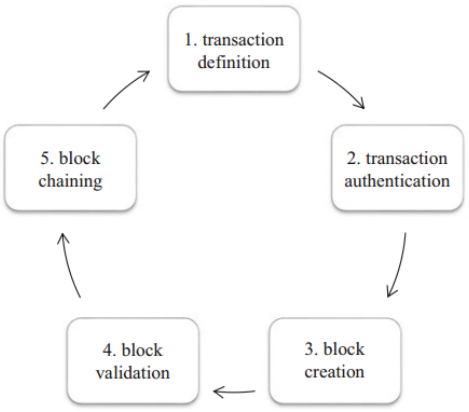

Fig 6. The general process of Blockchain technology

In step 2, transaction authentication, the transactions of the contracting parties are validated after the messages are received by nodes or connected computer networks. Here the information regarding the parties who they really are, the ownership of the asset and money, to whom they really belong is checked and confrmed. The third step is concerned with block creation. This is where expected transactions are combined by one node into a block, which would continue to update the ledger for any new or pending transactions.

The fourth step is block validation where one of the nodes will act as a validator to ensure the transaction is not only correct but also transparent and free from negative elements such as riba, gharar, etc. A standard must be set for the validation process known to all the participants in the transaction. Such a standard should be reviewed by a group of reputable Shari'ah scholars or it should be in line with already existing and recognized Shari'ah standards. In the ffth step of block chaining, a new block is added when all the transactions are validated.

The new block and the ledger that is updated are then communicated to the participants in the network. Hereby, all the participants in the network get to know about the changes in the ownership over the asset and update their copies of the ledger. Furthermore, it is understood that in the case of Murabahah, it is necessary to have ownership over an asset (intended subject matter of (Murabahahsale) in order to conclude a Murabahahcontract. An asset can be owned by the seller or it can be bought before the Murabahahdeal, while the latter is called Murabahahto the purchase order (MTPO) and it is the most widely used among Islamic fnancial institutions (IFIs). The sequence is of the essence, especially when it comes to buy and sale cases.

In each case, the ownership over an asset will be recorded in the Blockchain with the details how it actually was transferred to the current owner. It is important to keep in mind that although undertaking given by a customer is binding, an IFI cannot force the customer to buy the asset, rather an IFI has right to indemnify itself for actual loss (difference between purchase and sale price of the asset in case the customer refuses to conclude Murabahahcontract) using security amount or from customer's account as the case might be. Therefore, the whole Murabahahdeal (including the steps of acquiring the asset and then selling it to the fnal customer) will be executed in two separate blocks. The former block will contain information of acquisition of the asset, while the latter will contain details of the sale. Nevertheless, both blocks' parameters will be similar.

Figure 7. shows the proposed smart contract model for the Islamic banking FinTech, the case of home fnancing. Figure 4.3below represents a revised model, with slight changes from the original model. In the revised model above, as suggested by P7 (section "Suggestions of Experts for Enhancing the Model") below, the Blockchain chains all the four parties: the Islamic bank (IB), the customers, the developer and the third party. In the original model, which is also a viable alternative, the Blockchain chains the IB and the customers.

The relationship between the two follows the steps shown in Fig 6. Meanwhile the housing developer relates to IB through an artifcial intelligence (AI) application in terms of big data in order to gather the data on potential customers. However, when it comes

to purchase of the house and transfer of the ownership of the house from the housing developer to IB, all of it is directly recorded in the Blockchain. The IB is also connected to a third party using AI. The third party could be a group of companies which not only provide data source for IB but also act as an arbitrator in case of disputes. Otherwise, it can be a government entity that regulates the banking activities in a particular jurisdiction where IB operates. It is important to mention that only certain information is stored and recorded in the Blockchain, like property details, ownership, and so on. Other details, like market analysis, data on clients and so forth are auxiliary, that is, not part of a transaction. Therefore, such details should not be stored in the Blockchain in order to not overload it with unnecessary data.

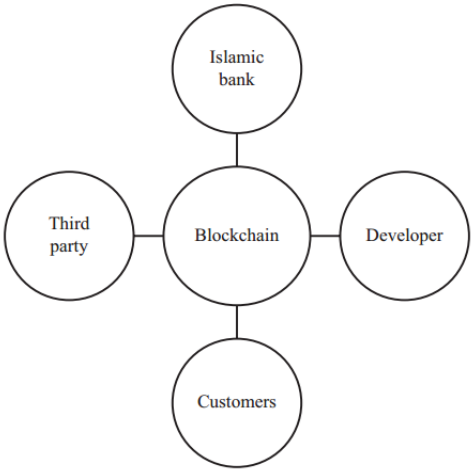

Fig 7. Proposed smart contract model for the Islamic banking FinTech

10. Impediments to the smart contract

Impediments to the smart contract development include traditional and dualistic mindset, the role of Shari'ah advisors, lack of wide range of data source, the increasing role of Islamic social fnance, lack of legal framework, infrastructure and expertise, among others. mindset of many leading Islamic banking managers is still traditional and dualistic. They can easily relate the normative aspects of Islamic banking such as the prohibition of interest, uncertainties, gambling, etc. But they cannot see how a Shari'ah compliant smart contract is feasible especially when Islamic banking still operates on conventional rules, regulation and infrastructure. The slow pace in developing smart contract model could be the way Islamic banking market is concerned about the role of Shari'ah advisors if smart contracts were developed especially when there are emerging issues that would require face to face meetings.

FinTech growth in Islamic fnance is predominantly impeded by lack of awareness and knowledge on different aspects of new technologies among practitioners. absence of a proper legal framework and recognition of smart contracts as real contracts by authorities in many jurisdictions as another major obstacle in adopting smart contracts by not only Islamic banks but also their conventional counterparts.

11. Challenges of Implementing the Model

There are pending challenges, which include human resource development, educating customers, security features, the diffculty of having a generic model, and role of the third party.

The present quality of human resource and the banking sector were not trained to handle disruptive technologies, so they will need to be trained to keep abreast of the developments in the FinTech revolution. This will provide them with the ability to handle the model.

There is a need to educate the bank customers about the new product . Generally, bank customers are conservative, but when they see something new that is simple to understand and cost-effective they will quickly accept it and adopt it. Therefore, there has to be a lot of campaign and advertisements about the features of the new product especially its benefts to the customers compared to their existing product. Customers will have the incentives to migrate quickly to the new product.

Although the technology promotes transparency recently there are reported cases of fraud even in the

case of cryptocurrency that uses Blockchain technology. They are also concerned about the need for thirdparty involvement, especially that contracts through smart contract model are normally irrevocable. So the role of third-party arbitration becomes paramount. technical scalability, trust in business innovation, encrypted money (encrypted coin) network, and regulatory requirements. the main challenge will be to connect all the relevant parties including authorities to transact over the Blockchain.

12. Conclusion

The Islamic fnance industry has witnessed an increasing interest in the FinTech wave. While progress has relatively been made in the areas of Robo-advisory, sandbox, payment system and investment, among others, the applications of these Islamic fnance FinTech business models have been in isolation. They lack the depth of using the power of FinTech to harness their relationships. Islamic Finance sector has also embrace this change. In Malaysia, the Islamic banks are on Fintech too. Maybank, CIMB Bank, Hong Leong Bank and RHB Bank among the few that join Fintech, which some of them cooperate with local companies to come out with Fintech innovations like remittance and P2P (Nurul Aini & Ainulashikin, 2018).

Smart contract could support the Islamic finance products in several areas like capital market, Islamic investment, takaful and many more (Siti Rohaya, Zam Zuriyati, Juliana, Farhana Hanim, & Norhayati, 2018). However, there are very limited discussion on the smart contract in Islamic Fintech with Shariah principles underlies. This is because the sector and industry itself is considered nascent (MIFC, 2016; BIS, 2017). Furthermore, the studies in Islamic Fintech and smart contract is currently underexplored (Alharby & Moorsel, 2017) and most of the studies in Islamic Fintech is hovering in concept, legal issues and regulation.

There are limited discussion on smart contract and Islamic Fintech and its Shariah principles. Hence, the Shariah principle in smart contract of Islamic Fintech need to be addressed.The model has been validated. The model is viable and acceptable, and has huge potential in the future. The concerns on the major challenges Islamic banking is likely to face in implementing the model. These challenges include security, quality of human resource and capacity building, the traditional mindset, and inadequate infrastructure.

There is an absence of integrated business models. This researc has developed a Smart Contract model for the Islamic banking FinTech industry, taking home fnancing as a case. The model has been validated . The model is viable and acceptable, and has huge potential in the future. The concerns on the major challenges Islamic banking is likely to face in implementing the model. These challenges include security, quality of human resource and capacity building, the traditional mindset, and inadequate infrastructure.

The suggested of the model needs to be enhanced with technical details, creation of a new generation of managers, an increase of investments on technology, among others. The novelty of the study lies in setting a new research direction for integrated FinTech models that can be instrumental in further enhancing the effciency of the Islamic banking and fnance industry.

Reference

1) AAOIFI. (2015). Shari'ah standards(3rd ed). Manama, Bahrain: Dar AlMaiman for Publishing & Distributing
2) Alam, Nafis, Ali, Syed, (2021). "Fintech, Digital Currency and the Future of Islamic Finance". Cham: Palgrave Macmillan.
3) Alam, Nafis, Gupta, Lokesh, & Zameni, Abdolhossein (2019). "Fintech and Islamic Finance: Digitalization, Development and Disruption". Cham: Palgrave Macmillan
4) Alharby, M. & Moorsel, A. V. (2017). Blockchain-Based Smart Contracts: A Systematic Mapping Study. *Computer Science & Information Technology (CS & IT)*, pp: 125-140.
5) Arbouna, Mohammed burhan(2007) The Combination of Contracts in Shariah: A Possible Mechanism for Product Development in Islamic

Banking and Finance. Thunderbird International Business Review, Vol. 49(3) 341–369.

6) BIS (2017). *Sound Practices: Implications of Fintech developments for banks and bank supervisors.* Switzerland: Basel Committee on Banking Supervision.
7) Dadabhoy, I. (2018). Introduction to FinTech and Smart Contracts (Slide). *IIFM Seminar on Islamic Financial Markets*, 8th May 2018, Kuala Lumpur.
8) Delmolino, K. Arnett, M. Kosba, A. Miller, A. & Shi, E. (2016). Step By Step Towards Creating A Safe Smart Contract: Lessons And Insights From A Cryptocurrency Lab. In *International Conference on Financial Cryptography and Data Security*, pp. 79-94. Springer, Berlin, Heidelberg.
9) Djafri, F. (2017). Summary Report of the '*LSE-HBKU Workshop on Fintech and Islamic Finances*' hosted by the Center for Islamic Economics and Finance (CIEF), College of Islamic Studies, Hamad Bin Khalifa University at the London School of Economics on February 23.
10) Dwi Marlina, W. & Alex, F. R. (2017). Shariah Fintech: Positive Innovation in Consumer Perspective. Proceeding *International Seminar on Competition Policy and Law*. Nusa Dua, Bali, September 6, 2017, pp. 101-120.
11) Ernst & Young (2016). *Landscaping UK Fintech*. UK: UK Trade and Investment.
12) Hazwan Faisal, M. (2018). Kerajaan komited perkasa Fintech di Malaysia. *Berita Harian*, 7 March. Retrieved
13) Ibn Manẓūr, Abū al- Faḍl Jamāl al-Dīn Muḥammad Ibn Mukarram. 1954. Lisān Al-'Arab. 4th ed. al- Qāhirah: al-Dār al- Miṣriyyah li al-Ta'līf wa alTarjamah.
14) Idelberger F. Governatori G. Riveret R. Sartor G. (2016) Evaluation of Logic-Based Smart Contracts for Blockchain Systems. In: Alferes J. Bertossi L. Governatori G. Fodor P. Roman D. (eds) *Rule Technologies. Research, Tools, and Applications*. Lecture Notes in Computer Science, vol 9718. Springer.
15) International Trade Administration (ITA) (2016). *2016 Top Markets Report Financial Technology*. US: Department of Commerce.
16) IRCIEF (2018). Roundtable Discussion On Cryptocurrency: Issues And Solutions. *IRCIEF KUIS*. Retrieved
17) Islamic Business & Finance (2017). Is Fintech Shari'ah compliant? In *Developing Islamic Fintech*, Issue 104. CPI Financial FZ LLC, pp: 16-18.
18) Laldin, M., A. (n.d). Fintech and Smart Contract: Opportunities in Islamic Finance. Retrieved from *International Islamic Financial Market*.
19) Lauslahti, K., Mattila, J., & Seppälä, T. (2017). Smart Contracts – How will Blockchain Technology Affect Contractual Practices? *ETLA Reports No 68*. Retrieved .
20) Lee, in, shin, yong (2018) Fintech: Ecosystem, business models, investment decisions, and challenges. Business Horizons, vol. 61, issue 1, 35-46
21) Maulidizen, Ahmad. (2016) "Penjadualan Semula Pembiayaan Mikro Murābaḥah Di Bank Syariah Mandiri, Indonesia." Universiti Malaya Kuala Lumpur.
22) MIFC (2016). *Islamic Finance Technology and Innovation*. KL: Bank Negara Malaysia.
23) Muthiah, A. Z. R., Ro'fa, S., & Islamiyati (2017). Crowdfunding Syariah Untuk Pengembangan Produk Perbankan Syariah Dari Perspektif Shariah Compliance. *Diponegoro Law Journal*. Vol. 6(4). pp: 1-16.
24) Nurul Aini, M., & Ainulashikin, M. (2018). Will Fintech Disrupt Islamic Banks? In *Extending the Boundaries of Islamic Finance, Vol. 4, YTI Lecture Series* (pp: 182-195). Ed: Mohd Daud Abu Bakar, Amir Shaharuddin & Nazratul Aina, M.A. Nilai: USIM Press.
25) RedMoney (2018). *IFNFintech: Unlocking the Potential of Islamic Finance*. Vol. 2, Issue 1.
26) Shariyah Review Bureau (2018) Decoding Compliance of an Iconic Offering (ICO). Shariyah Review Bureau. Retrieved .

27) Siti Rohaya, M. R., Zam Zuriyati, M., Juliana A.B., Farhana Hanim, M., & Norhayati, M. I. (2018). Artificial Intelligence, Smart Contract and Islamic Finance. *Asian Social Science*; Vol. 14, No. 2; pp: 145-154.
28) Surendra, E. (2017). *Introduction to Fintech in Malaysia*. iMoney.my. 30 January.
29) Szabo, N. (1997). Formalizing and Securing Relationships on Public Networks. *First Monday*, 2(9), Retrieved.
30) Todorof, M. (2018). Editorial: Shariah-compliant Fintech in the banking industry. *ERA 2018* (Springer).
31) Zavolokina, L.. Dolata, M., & Schwabe, G. (2016). The FinTech phenomenon: Antecedents of financial innovation perceived by the popular press. *Financial Innovation*, 2(16), pp: 1-16. DOI 10.1186/s40854-016-0036-7.
32) Zerado & Fintech Network (2017). *Smart Contracts – From Ethereum to Potential Banking Use Cases*. Retrieved.

International Journal of Financial Technology Prospective
(FinTech)
سال (۲) / شماره (۳) / زمستان ۲۰۲۵

قرار داد هوشمند در بانکداری اسلامی

فاطمه پورعسکری جورشری
دکتری مالی- مهندسی مالی

چکیده

قرارداد هوشمند نوعی جدید از قراردادهای الکترونیکی می‌باشند که می تواند سهم بازار را به سرعت به دست گیرد. هدف اصلی قرارداد هوشمند، تسهیل انتقال دارایی های دیجیتال بین طرفین قرارداد بر اساس شرایط از پیش توافق شده است. مفهوم قراردادهای هوشمند با ساختار مؤسسات مالی اسلامی منطبق است و برای تأمین مالی اسلامی می تواند پیاده سازی شود. قرارداد هوشمند با عقد قرارداد اسلامی مطابق دارد و شفافیت را در معاملات ایجاد می نماید. در این تحقیق، مشخصه‌های اصلی قرارداد هوشمند و کاربرد قرارداد هوشمند در صنایع مختلف ارائه شد. از سوی دیگر مدل سنتی تسهیلات مسکن خریدار بر پایه مرابحه شرح داده شد همچنین قرارداد هوشمند پیشنهادی برای تسهیلات مسکن اسلامی و مدل قرارداد هوشمند پیشنهادی و همچنین موانع و چالش‌های آن برای فین تک بانکداری اسلامی ارائه گردید.

کلمات کلیدی

قرارداد هوشمند، مرابحه، بانکداری اسلامی، بلاک چین