ROUTLEDGE

FINTECH IN ISLAMIC FINANCE

Theory and Practice

Edited by UMAR A. OSENI AND S. NAZIM ALI

FINTECH IN ISLAMIC FINANCE

Featuring high-level analysis of Islamic law, this book examines fintech in Islamic finance from both theoretical and empirical perspectives. Whilst building on existing approaches, it also discusses the current application of fintech in promoting financial inclusion through innovative solutions in Muslim-majority countries, identifying future directions for policy-makers.

With original chapters written by prominent academics, senior lawyers and practitioners in the global Islamic finance industry, this book serves as the first standalone pioneering reference work on fintech in Islamic finance. It also, for the first time, examines the position of Islamic law on cryptocurrencies, such as bitcoin. Besides the conceptual analysis of the Sharīʿah and legal aspects of fintech in Islamic finance, this book provides relevant case studies showing current and potential developments in the application of fintech in various sectors ranging from crowdfunding and smart contracts, to Online Dispute Resolution, Investment Account Platform and identity verification in the KYC process.

Setting the agenda for researchers in the field, *Fintech in Islamic Finance* will be useful to students and scholars of Islamic finance and financial technology.

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The whole idea of coming up with a book that brings together different concepts and case studies on fintech in Islamic finance started after the successful staging of the 11th LSE–HBKU Workshop on "Fintech and Islamic Finance: Applying *Hiyal* & *Makharij* and other Islamic Principles". The workshop was held on 23 February 2017 at the London School of Economics (LSE). Leading finance, legal and Sharī'ah experts attended the workshop at LSE which was moderated by Professor Frank Vogel. We would like to thank the moderator, participants and the host, LSE.

After the workshop, which was very engaging and rich in discussion, we decided to invite some key contributors from across the world who are accomplished professionals to contribute to a book believed to be the first of its kind. Some of the chapters in this book were developed later based on preliminary written comments submitted for the workshop. From that moment onwards, we widened the potential contributors' base to include other leading authors.

This painstaking effort in identifying leading authors for this pioneering project is unprecedented; and we would like to thank all contributors for their support and cooperation throughout the editing process. Despite the numerous iterations with the authors and scores of correspondences to ensure all chapters were turned in within a reasonable time, we found the authors to be very cooperative and responsive. We are convinced that this would not have been possible without the constant reminders from the publisher to meet the timeline for the book. Specifically, we appreciate the efforts of one of the contributors, Dr. Sodiq Omoola, and a research scholar, Abdurahman Jemal Yesuf, both of whom helped at different stages in ensuring all chapters comply with the standard referencing style in a consistent manner.

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We hope these humble efforts will help to spur further research in this unique field and trigger further innovative fintech products, services and solutions in the global Islamic financial services industry.

Umar A. Oseni
S. Nazim Ali

ABBREVIATIONS

AAOIFI	Accounting and Auditing Organisation for Islamic Financial Institutions
ADR	Alternative Dispute Resolution
AH	After Hijrah. This is used to denote the Islamic Calendar, which counting began in the year Prophet Muhammad migrated from Makkah to Medina
AI	Artificial Intelligence
AML	Anti-Money Laundering
API	Application Programming Interface
ATM	An automated teller machine
B2B	Business-to-business or trade conducted between business via the internet.
B2C	Business-to-consumers or trade conducted between businesses and consumers via the internet.
BSAS	Bursa Suq Al-Sila – an online platform in Malaysia for managing commodity *murābahah* transactions
BTC	Bitcoin
CMTP	Commodity Murabahah Trading Platform
CPU	Central Processing Unit
DAG	Directed acyclic non-recursive graph for storing transactions
DAO	Decentralised autonomous organisation
DAPPS	Decentralised applications
DFSA	Dubai Financial Services Authority
DIAO	Decentralised intelligent autonomous organization
DLT	Distributed Ledger Technology
DMCC	The Dubai Multi Commodities Centre
ECF	Equity crowdfunding

EPR	Expected Profit Rate
ESG	Environmental, Social and Governance
EY	Ernst & Young
FAST	Malaysia's Fully Automated System for issuing/Tendering
GAFA	Google, Amazon, Facebook and Apple
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
GDPR	The European Union General Data Protection Regulation
GPS	Global Positioning System
HNWI	High Net Worth Investors
HTTP	A simple but universal mechanism for retrieving resources
IAP	Investment Account Platform
ICO	Initial coin offering or initial currency offering (sometimes called "initial public coin offering")
IFSB	Islamic Financial Services Board
ICT	Information and Communications Technology
IOT	Internet of Things
IOTA	A Distributed Ledger Technology developed by the *IOTA* Foundation
KYC	Know Your Customer
LEI	Legal entity identifier
MEPS	Malaysian Electronic Payment System
MSMES	Micro, Small and Medium Enterprises
ODR	Online Dispute Resolution
P2P	Peer-to-Peer
PBUH	Peace be upon him [Prophet Muhammad]
R&D	Research and development
REGTECH	Regulatory technology
RELAB	Regulatory laboratory
ROI	Return on Investment
S&P	Rating agency, Standard and Poor's
SDG	United Nations Sustainable Development Goals 2030
SME	Small and medium enterprises
SPV	Special Purpose Vehicles
SRI	Socially Responsible Investing (or Investments)
SSID	Self-Sovereign Identity
URIS	A way to identify entities

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PART I

Introduction

1

FINTECH IN ISLAMIC FINANCE

Umar A. Oseni and S. Nazim Ali

Just as we were completing the editing of this book, Malaysia introduced a new subsidiary legislation to regulate cryptocurrencies in the country. The news hit global headlines, particularly among the tech communities. The law, Capital Markets and Services (Prescriptions of Securities) (Digital Currency and Digital Token) Order 2019, which regulates all initial coin offerings (ICOs) and cryptocurrencies, came into force on 15 January 2019. It classifies cryptocurrencies and digital tokens or digital assets as securities. Without doubt, cryptocurrencies seem to be the most visible albeit controversial example of fintech. This further justifies the need to clarify the legal, regulatory and Sharī'ah issues pertaining to such fintech applications.

Fintech is changing our lives for the better through unending technological applications in the finance industry. The daily lives of human beings, and even non-humans, are now tied to technological applications where robots have taken over the roles of financial advisors. While regulators and lawmakers try to catch up with the rapid developments in financial technology, it appears the rapid rate of development in the fintech sector is outpacing regulatory frameworks. This uncertain situation is more complicated in a niche industry such as the Islamic financial services industry, which has additional faith-based filters in its product-development process. This therefore makes a case for the need for thought leadership in relation to this uniquely important subject in order to guide policymakers, regulators, and practitioners on the dynamics of fintech in Islamic finance, and provide a good understanding of the Sharī'ah and legal and regulatory parameters for fintech solutions.

A quick search of the available books on fintech reveals that one of the earliest publications on this subject was published in 2016. With the exception of a few books on fintech published in earlier years, most leading books on fintech were published in 2016 due to the novelty of the phenomenon.[1] It thus appears the academic response to practical applications in the financial technology industry is not as fast as the emergence of innovative fintech applications in different sectors

of the financial industry. This makes a case for the need for deeper studies beyond the discourse of the disruption of the banking sector which has dominated the whole idea of fintech in the past few years.

Fintech should be understood to cover all aspects of the application of technological advancement in delivering, facilitating, or enabling financial services. Therefore, fintech includes blockchain applications and other web-based services utilised in the financial services industry as well as offline-to-online (O2O) and Internet-of-things (IoT) applications. One could simply say the list is endless and such should be the general understanding of fintech rather than confining it to the most prevalent applications such as blockchain technology and cryptocurrencies.

Being a pioneering book in the field of fintech in Islamic finance, this book offers fresh and alternative ideas of fintech applications while addressing some socio-economic, legal and Sharī'ah issues associated with such applications within the general purview of the Islamic financial services industry. While there has been too much emphasis on crowdfunding, cryptocurrencies and blockchain technology in the general discourse on fintech, this book provides additional areas of application within the transaction spectrum of Islamic financial contracts such as legal documentation, e-commerce and dispute resolution which is at the tail-end of the whole transaction process. For this, the book addresses online dispute resolution (ODR) and its relevance to Islamic financial transactions with specific reference to how such a mechanism could be applied under the existing legal and regulatory framework in Malaysia (Oseni and Omoola 2015).

Just like the conventional fintech landscape, the list of fintech applications or solutions in Islamic finance is endless. In fact, besides areas such as anti-money laundering and anti-terrorism financing and customer due diligence, fintech could also be applied to aspects of Sharī'ah verification of transactions and robo-Sharī'ah advisors. These unique aspects, which might not be necessary in the conventional application of fintech, necessitate the need to specifically address fintech from the Islamic finance perspective. This huge vacuum is what this book seeks to fill in its length and breadth.

Fintech in Islamic finance should be generally understood in a broad manner as Islamic financial services transcend mere banking. The Islamic financial services spectrum comprises of Islamic banking, Islamic insurance or *takāful*, Islamic capital market and Islamic money market. From the transactional perspective, the understanding of fintech in Islamic finance includes all aspects of a typical Islamic financial services transaction starting from the negotiation phase, credit scoring/checking phase, documentation phase, execution phase and up to the post-transaction issues such as managing defaults, addressing disputes and enforcement of contractual terms, judgements of the courts/arbitral tribunals or settlement agreements.

Current trends in fintech application

In an Ernst & Young Report titled *Banking in Emerging Markets: GCC Fintech Play 2017*, it was revealed that the private sector investment in fintech increased from

less than US$3 billion in 2012 to US$19 billion in 2015. This promising and disruptive technological innovation in the financial services sector is being considered as the future of the global financial system. Though the fintech aggressive revolution is said to enhance consumer value proposition in the financial services sector, one would also like to consider whether there is an additional proposition in infusing Sharī'ah-compliant principles in the disruptive innovations to further enhance the consumer experience of a segment of the financial consumers who are biased towards Sharī'ah-compliant financial services.

For the purpose of identifying the applicable Sharī'ah principles, it may be helpful to define fintech in its general sense and identify its different components and applications. Therefore, adopting the Wharton Fintech Club definition, fintech may simply be referred to as "an economic industry composed of companies that use technology to make financial systems more efficient" (McAuley 2014). The Sharī'ah principles will only apply to each of the components or applications after a careful study of the specific details rather than the generic term "Fintech". This is why this book does not use the term "Islamic Fintech", which is becoming popular among Muslim finance professionals. Although, from the branding perspective, "Islamic Fintech" appears to be more appropriate to demonstrate the uniqueness of fintech solutions in Islamic finance, it is preferable to use the terms "Sharī'ah-compliant Fintech" or simply, "Fintech solutions in Islamic finance". Giving fintech the "Islamic" label presupposes that it is truly Islamic – a feature which can only be determined upon obtaining a formal Sharī'ah approval. After all, fintech is merely a means to an end and not the end itself; hence, it should not necessarily carry the full "Islamic" label.

Moreover, there is some sort of confusion in identifying what is and what is not of fintech. While there has been much emphasis on blockchain technology, there are other less complicated applications that may also fall under the general purview of fintech. This is probably why it is difficult to address all operational issues affecting fintech applications. The same thing is true for applicable Sharī'ah principles. It might be difficult to address all Sharī'ah issues relating to fintech, as this remains an evolving phenomenon whose components and features have not been exhaustively discussed. However, it is important to agree on what fintech entails through the identification of what it applies to. In this context, one could say fintech includes any technological application to financial services transactions from the negotiation stage through the documentation, execution and closing stages of the transaction, including matters connected to how disputes emanating from such transactions are resolved.

Understanding this book

With the complex fintech ecosystem, which according to a Fintech Report by PwC, has the following key players – financial institutions, tech companies, infrastructure players, start-ups, regulators and government, consumers and users, investors/incubators/accelerators – this emerging field requires close

scrutiny, regulation and consideration of applicable legal and Sharī'ah principles. Emerging technologies and tools have undoubtedly disrupted the traditional financial tools, and, as such, Sharī'ah scholars ought to be far ahead of such developments. Therefore, in order to address these issues, this book is divided into six distinct but related parts. After this Part I, the next part, Part II focuses on fintech and financial intermediation, while considering the unique opportunity fintech creates for Islamic finance development. Part III sets the Sharī'ah parameters for fintech, which serves as a valuable guide to innovators and regulators alike. It also clarifies the position of Islamic law on cryptocurrencies such as bitcoin. Part IV examines the legal and regulatory issues in fintech, including the potentials of smart contract in Islamic finance.

Having set the Sharī'ah and the legal and regulatory framework for fintech solutions in Islamic finance in the previous parts, Part V provides useful case studies on fintech applications in Islamic finance. It also provides potential use cases of fintech applications, which could be taken to the next level. Such significant discussion on case studies, which transforms concepts to real-time applications, will be useful for technopreneurs. Finally, Part VI provides some future directions and impact of fintech in Islamic finance.

Fintech and financial intermediation

Though some studies have raised some concerns on how fintech might potentially exclude a larger segment of the society from financial services, one may conversely argue that with the proliferation and penetration of mobile and internet connectivity across remote societies in developing countries, fintech will better enhance financial inclusion. However, what does fintech have to offer to a vulnerable segment of society which prefers Sharī'ah-compliant financial services, and is thus self-excluded due to the non-availability of financial services that are in consonance with its religious ideals? This is where the discussion on fintech and its potentials for furthering the goal of Islamic social finance is germane.

It appears the original DNA of fintech, which relies on a group of participants and in some cases big data, is similar to the communal principles in Islam otherwise known as *ummah*, where social solidarity is paramount. The ability to mobilise funds for a common or communal cause through crowdfunding, which in some cases is more of donation or interest-free loans, presents a new mode of financing that mirrors the traditional Islamic principles of social finance. Therefore, one may ask whether fintech is a natural form of Islamic finance. A further question that may be addressed is whether the emergence of fintech and the increasing adoption of fintech solutions in Islamic financial services presents a unique chance to re-orientate Islamic finance and streamline its value proposition towards social finance.

From the social finance perspective, can fintech promote financial inclusion in Muslim majority countries? While some have argued that fintech will

further deepen the surge of financial exclusion, the rate of internet penetration and adoption of mobile technologies in most rural areas in Muslim countries presents a different scenario. Hence, it is believed fintech has the potential of promoting financial inclusion and has some inherent developmental objectives which will help promote the 17 Sustainable Development Goals (SDG) of the United Nations in Muslim-majority countries. It is pertinent to note that fintech in Islamic finance will not only be relevant in ending poverty and hunger, it will also help to improve health and education, make cities more sustainable, combat climate change, and protect oceans and forests. This social dimension to fintech in Islamic finance is important to emphasise the need to come up with Sharī'ah-compliant solutions which can be funded through Sharī'ah financing to promote sustainable development (Ansari et al. 2012; Bennett 2015). There are increasing interests in green financing which has seen the issuance of Green Sukuk in Malaysia based on the Malaysian SRI Sukuk Guidelines (Moghul and Safar-Aly 2014). Undoubtedly, Islamic finance has more areas of convergence with the socially responsible investment (SRI) movements than any other financing model (Oseni 2014), and automating such processes through fintech will help to emphasise and promote the social element in Islamic finance as it relates to the higher objectives of Islamic law (*maqāsid al-Sharī'ah*).

Setting the Sharī'ah parameters

What is unique about fintech in Islamic finance? Is fintech in Islamic finance different from the conventional fintech? What are the parameters for any new technological disruption in Islamic finance? As earlier highlighted, fintech goes beyond just cryptocurrencies, as it covers a wide spectrum of application of innovate technology in financial services. So, rather than confining the discussion to cryptocurrencies, other beneficial applications such as online crowdfunding platforms, e-commerce, smart contracts, blockchain technology and online dispute-resolution platforms for Islamic finance disputes may be less controversial. With emphasis on blockchain technology and the significance of smart contracts, Islamic banks may leverage on this for Islamic finance agreements that have the ability to self-execute, self-maintain, and self-enforce, thereby reducing uncertainties in dispute-resolution processes through litigation (Oseni and Omoola 2015; Koulu 2016; Watanabe et al. 2016a, 2016b).

The fintech universe is complex. As such, fintech applications may be grouped according to the financial market activities where they are applied. For payment, clearing and settlement, one may have the following applications: mobile, web and contactless payments, digital currencies and distributed ledger technologies. For deposits, lending and capital raising, one could have the following applications: peer-to-peer lending, marketplace lending and crowdfunding. Another category is market provisioning, which includes e-aggregators, smart contracts, Big Data and digital identity. Finally, for the investment management category, the following applications are prevalent: robo-advisor and electronic trading. All

these applications are regulated under the RegTech framework (Adams 2016: 3). These are just examples of prominent fintech innovations, which is a non-exhaustive classification. The implication of this is that Sharī'ah scholars may need to come up with applicable principles on each innovation.

One key aspect of fintech which is conspicuously missing in the ongoing discussions and application of fintech in Islamic financial services and products is online dispute resolution (ODR). There has been an attempt to explore the relevance of ODR in Islamic banking generally and the prospects of such technological innovation in reducing the number of Islamic finance disputes going to the courts. In the model, which has been conceptually analysed and empirically tested, Sharī'ah compliance of the settlement decision is emphasised to ensure the process and outcome are both driven by the same principles underpinning Islamic financial transactions (Oseni et al. 2018; Oseni and Omoola 2017).

When it comes to fintech solutions in Islamic finance, Sharī'ah compliance is paramount and this should be based on the same principles applicable to commercial transactions with particular reference to the prohibited elements in commercial contracts and operations for financial services. The same general principles can be applied to specific instances. This will, however, require legal adaptation (*takyif fiqhi*) to address the peculiarities of fintech, as there are no precedents to these disruptive innovations (Shubayr 2004). This has been proposed recently by the Dubai Financial Services Authority (DFSA) which seeks to subject Sharī'ah-compliant equity crowdfunding platforms to the original rules applicable to Islamic financial institutions.

A former Secretary General of the Islamic Financial Services Board (IFSB), Jaseem Ahmed (2017) summarised the importance of considering Sharī'ah and regulatory issues while embracing the solutions fintech has to offer to the Islamic financial services industry:

> From the Sharīah perspective, there are two complementary principles at stake: first the principle that in *fiqh al-mu'āmalāt* innovations are allowed unless they fall under an explicit prohibition, and second, the rather detailed requirements of Islamic law for the validity of exchange contracts. Contractual uncertainty may pose a challenge in many Fintech cases.
>
> At the same time, subject to conformity with Sharīah principles, solutions from other FinTech areas such as blockchain and smart contracts may help to improve operational efficiency in Islamic finance. … The Sharīah compliance challenge is in identifying the perimeter of permissible innovation, when the formal requirements of classical contracts are not met, whilst elucidating the modifications that would permit access to the new technology on a Sharīah-compliant basis.

These concerns in setting the Sharī'ah perimeters of permissible innovations and applications are addressed in a systematic manner in this book by leading Sharī'ah scholars.

One may ask how to apply Islamic *fiqhi* (jurisprudential) tools such as *hiyal* (legalistic trickery) and *markharij* (legal solutions in compliance with the spirit of Islam), *maslahah* (public interest), and *dhara'i* (blocking the means to evil) to new fintech-driven products, solutions, services and contracts. The question is whether we should wait for issues to emerge and mature or imagine and be prepared with a more suitable response. Issues have already emerged. There are some existing Sharī'ah opinions, which some may consider "cursory" at this stage because the premise of such opinions is not generically based on in-depth scholarly research. While some scholars have declared, for example, cryptocurrencies such as bitcoin as impermissible, others have considered such innovations permissible. In fact, some proponents of some of the applications of fintech have resorted to fatwa shopping to get favourable rulings to support their online trading of bitcoin (Oseni et al. 2016). So, this is the time Sharī'ah scholars should come up with informed scholarly opinions on specific issues. With particular reference to cryptocurrencies and the seeming revival of Islamic dinar and dirham, Sharī'ah scholars may come up with informed opinions to prevent abuse of the common naivety in most Muslim communities where there is always the tendency of manipulating people's beliefs for marketing purposes. Over the past few decades, one has seen the different dimensions of faith or *taqwa* premium in marketing Sharī'ah-compliant products and services in many jurisdictions, particularly in western societies (Khan 2014).

There is what is called "Islamic Cryptocurrency E-Dinar Coin" online and Muslims are being encouraged to join the bandwagon. In this specific case study, there is an interest rate of up to 0.65 per cent to be paid daily. These are areas leading Sharī'ah scholars may scrutinise to guide the unsuspecting and naive Muslim investors.[2] Such practices therefore make a good case for an authoritative text that will guide policymakers, unsuspecting investors, students, as well as regulators on key Sharī'ah and legal parameters in the application of fintech solutions in the Islamic financial services industry.

From the Sharī'ah perspective, *maqāṣid al-shari'ah* will continue to be relevant in fintech, as the *maslahah* provided by the new technologies trumps any other argument that seeks to preserve the traditional financing methods. Therefore, when there is a conflict between public interest and private interest, the former will prevail as established by the early Muslim jurists (Kamali 2009). This makes a case for the adoption of fintech in Islamic commercial dealings.

In addition, how do we consider the *maslahah* in robo-advisors for portfolio management? More importantly, what is the value of Sharī'ah robo-advisors or robo-advisors for Sharī'ah-compliant products? (Andrus 2014; Hougan 2015). This might pose significant legal, operational, reputational, and Sharī'ah risks to Islamic financial transactions. Can investors trust robots to render better investment advice in Sharī'ah-compliant transactions? Can we replace Sharī'ah officers in financial institutions with robots? This would have some implications for consumer protection laws and agencies. Therefore, a *maslahah* determination of fintech should consider the imperativeness of legal and regulatory framework to

avoid market abuse which is currently being experienced in some cryptocurrency applications. Important points to consider here include the following:

(i) For cryptocurrencies, who determines the legal tender in a particular jurisdiction? Legal tender should ordinarily be determined by a constituted authority in a particular jurisdiction. Public interest overrides individual interest in this case (Hasan 1971). Therefore, all forms of cryptocurrencies should be regulated in each jurisdiction to avoid abuse, fraud and financial misconduct which may lead to money laundering and terrorism financing.
(ii) *Sadd al-Dhari'ah*, or blocking the means to evil, may be invoked to avoid associated harm in some of the fintech applications, particularly cryptocurrencies.
(iii) Necessary safeguards should be put in place to avoid operational failures where the data of investors are compromised.
(iv) There is a need to consider the effect of hacking of the blockchain technology applications and the effect of such on the funds invested by the people. Sharī'ah and legal scholars may introduce a strict liability regime to protect the investments.

Legal and regulatory framework for fintech

Leaving fintech without regulation or robust legal framework will render the whole disruptive innovation susceptible to abuse, misuse and devastating manipulations. Therefore, regulatory technology or RegTech may have to step up its proactive regulations to regulate fintech applications. Beyond RegTech, there is a need for regulatory guidance for the application of fintech in financial services as recently experienced in Malaysia with the enactment of the Capital Markets and Services (Prescriptions of Securities) (Digital Currency and Digital Token) Order 2019.

On 31 March 2016, the Office of the Comptroller of the Currency (OCC) of the United States released a White Paper that outlines its support for responsible innovation in the country's federal banking system. The OCC defines "responsible innovation" as:

> The use of new or improved financial products, services, and processes to meet the evolving needs of consumers, businesses, and communities in a manner that is consistent with sound risk management and is aligned with the bank's overall business strategy.
>
> *(Curry 2016)*

This recognises and acknowledges the OCC's receptivity to innovative solutions such as fintech as long as they uphold sound risk management and corporate governance principles, and comply with relevant laws and regulations, and protect consumer rights.

In evaluating the innovative products and services offered and/or performed by banks, the OCC formulated eight principles which mirror its perspective of fintech solutions. Therefore, the OCC would:

> Support responsible innovation, Foster an internal culture receptive to responsible innovation, Leverage agency experience and expertise, Encourage responsible innovation that provides fair access to financial services and fair treatment of consumers, Further safe and sound operations through effective risk management, Encourage banks of all sizes to integrate responsible innovation into their strategic planning, Promote ongoing dialogue through formal outreach, and Collaborate with other regulators.
>
> *(Curry 2016)*

These principles are quite important in a global financial industry that experienced economic meltdown barely a decade ago and the ability of fintech innovations to effectively navigate strict financial laws and regulations in different jurisdictions. While it is important to create room and accommodate start-ups through fintech, consumer protection laws must be strengthened, and relevant laws and policies must be put in place to avoid an unprecedented devastating financial crisis.

From the Sharī'ah perspective, financial issues that have significant impact on people's lives and the overall economy cannot be left entirely in the hands of individuals. The state may step in to regulate an industry to ensure financial stability and consumer protection, particularly when unsuspecting investors may be the subject of financial abuse. The Islamic concept of *hibsah* which saw the introduction of the office of *muhtasib* (or ombudsman) in the early days of Islam is a testimony to this assertion (Rashid 2004). The *muhtasib* regulated the market and ensured financiers as well as vendors complied with the rules to avoid any business misconduct that would negatively impact the public (Abdul Hak et al. 2013). Such practice may be replicated in the modern application of fintech innovations in the Islamic financial services industry. For instance, as discussed earlier, individuals may not be legally empowered to determine the medium of exchange through cryptocurrencies. The constituted authority in the state may need to set the minimum regulatory standards as being experienced in some jurisdictions such as Singapore, the United States, and more recently, Malaysia.

Current and potential applications of fintech in Islamic finance

While the specific scope of fintech cannot be identified generally, as new innovative solutions for financial services keep springing up, one thing that remains constant in the analysis is that fintech has the potential to apply to financial services regardless of the nature and type of such services. For Islamic finance,

the application of fintech covers the conventional scope as well as certain unique aspects such as Sharī'ah advisory, ethical screening, and structuring of partnership products that are uniquely Sharī'ah compliant. As earlier observed, the application of blockchain technology and the internet platform or in general terms, the information and communications technology (ICT) revolution in Islamic financial services covers the whole spectrum from the negotiation phase up to post-execution matters such as dispute resolution, including litigation and arbitration, enforcement of awards and/or judgements of the court, defaults, debt restructuring, etc.

The most innovative application and disruptive application of fintech in the Islamic financial services industry, which is gradually gaining momentum and generating series of Sharī'ah debates and regulatory unclarity, is cryptocurrencies. As discussed earlier, despite the emergence of cryptocurrencies such as E-Dinar Coins, there are still unresolved Sharī'ah and regulatory issues that require in-depth research as highlighted earlier and as discussed in the relevant sections of this book. Setting the Sharī'ah parameters for these kinds of disruptive innovations goes beyond mere *halal* (permissibility) and *haram* (prohibition) from the strict Sharī'ah perspective. There are other aspects such as Sharī'ah public policy considerations, regulatory aspects, and the associated abuse and misuse of such innovations in an increasingly interconnected world.

For the current applications of fintech in the Islamic capital market, there has been a significant increase in the adoption of technology and innovative solutions in leading jurisdictions offering Islamic financial services. For instance, in Malaysia, the Investment Account Platform (IAP) was introduced as a cross-border multi-currency platform for facilitating regional and global financing opportunities for emerging business ventures. The IAP is based on a consortium of several Islamic banks who help as financial intermediaries to channel the funds to deserving business ventures.

Similarly, there have been other innovative solutions in Malaysia for liquidity management such as the Bursa Suq Al-Sila (BSAS) online platform for managing commodity *murābahah* transactions (Saiti et al. 2016). The platform provides a Sharī'ah-compliant trading mechanism for facilitating *tawarruq* (monetisation) and *murābahah* transactions online which is a seamless and fast process of concluding the applicable strings of transactions. This pioneering end-to-end Sharī'ah commodity trading platform was introduced as far back as 2009 and has since won global attention with the increasing use of the platform across borders. There is an increasing acceptance of the platform from participants across borders from different jurisdictions, particularly in the Middle East and North African and Asian regions. This has led to an annualised growth of 178 per cent in the use of the online platform for *murābahah* and related transactions between 2009 and 2014 (MIFC 2016).

In the United Arab Emirates, the Dubai Multi Commodities Centre (DMCC)'s Commodity Murabahah Trading Platform (CMTP) became fully functional in 2013. The CMTP adopts the tradable warrants model by enabling

transfer of ownership and possession through the online platform. Similar to the BSAS, the CMTP is a fully electronic platform for commodity *murābahah* transactions and it is Sharī'ah compliant. While addressing all possible Sharī'ah concerns, the platform provides the means to ascertain the existence of the underlying commodities and inspection by relevant parties to the transaction prior to final execution of documentation and conclusion of trade, verification of the underlying warrants to ensure that they are legally recognised documents, and a retrievable document trail with standard audit capabilities for both conventional and Sharī'ah audit functions (Nazir 2013). A similar innovative solution for Islamic financing through *wakālah* (agency) investments as underlying assets is the Nasdaq Dubai Murabahah Platform. The online platform provides a seamless, easy, and fast solution for Islamic banks who offer financing to customers.

Beside this application of fintech in Islamic capital market, there is increasing use of crowdfunding platforms for financing of Sharī'ah-complaint projects, particularly for small and medium-sized enterprises (SME), housing, and agricultural financing. A few of such case studies are provided in this book while other potential use cases are also discussed. Some of the innovative solutions discussed in this book include EthisCrowd, the IAP, Blockdentity, and WaqfCoin. This practical and professional dimension in the discussion of fintech in Islamic finance makes this book not only relevant for academics but also makes it an important handbook for practitioners who wish to expand and extend the frontiers of fintech applications or replicate the existing solutions in different jurisdictions.

Furthermore, fintech has engineered rapid developments in the mobile-payments space across the world. In fact, in some developing countries like Kenya, mobile payments have enhanced financial inclusion as more rural people have access to financial services. While this promising financial technology solution has been widely adopted in different forms, there is a need to examine specific legal and Sharī'ah issues in its application with a view to guide consumers who are religiously inclined to Sharī'ah compliance.

Conclusion: Future impacts of fintech in Islamic finance

While fintech applications in the banking and capital market sectors have been widely acknowledged, there has not been much focus on what we may refer to as *Taktech* or *takāful* technology. This is a Sharī'ah-complaint variant of the conventional insurtech. Taktech, being a subset of fintech in Islamic finance that combines the word "*takāful*" and technology, seeks to revolutionise the takaful sector by complementing existing initiatives to extend *takāful* to the underinsured segments of the population. Taktech is the latest buzzword that specifically refers to the application of technology in different aspects of Sharī'ah-compliant insurance schemes or *takāful* to complement existing practices, enhance financial inclusion, serve the underinsured, and promote best practices in service delivery to policy holders or participants.

Finally, it appears there has been too much emphasis on the technological part rather than to the financial component of fintech. This is why most frameworks have not really seen the relevance of Sharī'ah and its hermeneutic principles in fintech applications. While it might not be necessary to come up with terms such as "Islamic Fintech", the deployment of fintech applications for Islamic financial services and products should not only be properly regulated under the laws of different jurisdictions but emphasis should also be placed on Sharī'ah governance. Regardless of the numerous advantages inherent in fintech applications, its significant regulatory challenges remain a major concern in the global Islamic financial services industry.

Notes

1 Such books include *The FINTECH Book: The Financial Technology Handbook for Investors, Entrepreneurs and Visionaries* (Chishti & Barberis), *FinTech Innovation: From Robo-Advisors to Goal Based Investing and Gamification* (Sironi), *Fintech: The Impact and Influence of Financial Technology on Banking and the Finance Industry* (Hayen), *Bankruption: How Community Banking Can Survive Fintech* (Waupsh), *Innovation in Banking: Why FinTech challenges traditional business models and how this affects German retail banking* (Sprenzel), *Financial Technology: Fintech, Blockchain, Smart Contracts* (Reed), *FinTech: The Beginner's Guide to Financial Technology* (William), *Blockchain: Blockchain, Smart Contracts, Investing in Ethereum, Fintech* (Reed).
2 For more information on E-Dinar, see https://edinarcoin.com/faq-en/

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PART II

Fintech and financial intermediation

2

FINTECH

The opportunity for Islamic finance

Harris Irfan and Daniel Ahmed

Introduction: A brief history of Islamic finance

Islamic finance in its contemporary form traces its roots to the development of an economic model from the early history of Islam, and financial tools that emerged from that model. As the second caliph following the death of the Prophet Muhammad (pbuh), Umar ibn al-Khattāb instituted the *Bayt al-māl*, or Central Treasury, a state-run financial institution responsible for the administration of alms, including the distribution of *zakat*, the charitable wealth tax. Umar's vision of a compassionate society, which was centred on the protection of the weak and vulnerable, led to the establishment of the Central Treasury in the city of Madinah. The Treasury dispensed a welfare programme to ensure equality and a basic standard of living for all citizens, thus ensuring systematic provision for widows, orphans, the infirm, the unemployed and the elderly.

Umar also introduced the concept of public trusteeship and public ownership through the charitable trust system (*waqf*), a legal form of social collective ownership that allowed public property to generate an income stream for the benefit of the needy. By the thirteenth century, the concept of *waqf* had been imported into England as evidenced by the statutes of endowment of Merton College (Gaudiosi 1987), one of the earliest colleges of the University of Oxford. The endowment appears to be a direct translation from equivalent documents to be found in the Islamic world at the time. Thus, while maintaining its original form in the Muslim world, the principles of *waqf* have survived and evolved into contemporary English trust law.

As a result of this institutional framework, the basic principles of social advancement were in place during the early days of Islam. The framework was a conduit for the redistribution of wealth, rather than the accumulation of wealth by a ruling class. However, the conversion of contractual principles into

widespread practical commercial tools began to take shape a couple of generations later, through, for example, the work of scholars like Imam Abu Hanifah and his followers (Ash-Shaybani 1937).

Abu Hanifah's predisposition towards fairness in his dealings as a textile merchant inspired him to conceptualise a legislative framework for commercial and social interactions based on the life and actions of the Prophet (pbuh). Logic and analogy were key tools to codify the jurisprudence of commercial transactions, and thus the Quranic prohibitions on commercial speculation and unjust transactions found a firm practical footing in the rulings of Abu Hanifah and those who followed him. This codification of commercial law led to the development of a widespread money economy, with gold and silver eventually giving way to paper notes during the Ottoman empire. Cheques, letters of credit and the money transfer system – valid across distances of thousands of miles on the Silk Route – became essential lubricants of the Islamic world's economy. And whilst scholarship in the Islamic world flourished, so did its economy as well as its scientific and cultural well-being.

In time, Southern Europe would become a beneficiary of the entrepreneurial skills and commercial tools imported down the Silk Route by Arab merchants, and would eventually create its own financial institutions. By the Ottoman period, as European moneylenders gained in prominence, Ottoman practices fell into line and Sharī'ah-compliant financial tools gave in to interest-based European banking practices (Pamuk 2004, 2013).

The state of Islamic finance today

It was not until the mid-twentieth century that Islamic finance would reassert itself, perhaps as a consequence of Muslim-majority nations seeking to assert their post-colonial identities. At first, Islamic finance was experimental in nature. In 1963, the Egyptian economist, Dr Ahmed Elnaggar founded the Mit Ghamr Savings Bank, a profit-sharing institution that neither charged nor paid interest, and engaged in what today would be referred to as "real economy" transactions. It invested in trade and industry, sharing profits with depositors, functioning less as a commercial bank and more as a vehicle for savings and investments (Alonso 2015).

The Mit Ghamr experiment led to the creation of eight similar institutions in Egypt and the model was exported to other Arab nations. In 1975, Dubai Islamic Bank was launched in the United Arab Emirates and the experimental phase was over: Islamic banks had arrived. These early banks were largely built on concepts of investor/manager relationships in which a provider of capital entrusts that capital to a specialist for the purpose of investment, with both parties sharing in the ensuing profits or losses. As the business models of these early Gulf Cooperation Council (GCC)-based institutions matured, the industry increasingly began to mimic the practices and operations of conventional banks, driven in part by the success of "Islamic windows" of conventional international banks.

At first the international banks provided liquidity in the form of money-market lines to Islamic banks, but as the market potential became more apparent, they established their own Islamic finance teams to enable them to connect directly with the end customer. In the early 2000s, Deutsche Bank became the most successful and profitable exponent of the wider potential of Islamic finance. Its pioneering work in *Ṣukūk*, structured and hedging products, large acquisition financings and other complex investment-banking products catalysed growth in the market, and was widely copied by other international banks (Irfan 2015).

By 2008, the global financial crisis forced the international banks to retrench and retreat to more familiar territory. Islamic finance was too niche for them to deploy precious legal and compliance personnel at a time of increased regulatory scrutiny. The smaller regional banks lacked the research and development capabilities of the big banks, and growth rates contracted correspondingly (Kearney 2012).

Today, over $2 trillion of assets are currently attributed to the global Islamic finance industry (INCEIF 2017). Within that asset base, the Sharī'ah-compliant asset-management industry represents only $84 billion in assets under management, or 4 per cent of total assets. The vast majority of the Islamic finance industry is concentrated in banking assets and the Islamic finance industry is primarily defined by products developed and sold by banks. Whilst the Islamic economic model encompasses financial concepts ranging from not-for-profit charitable arrangements (such as the *waqf* or endowment, and *zakat* or the wealth tax), to for-profit commercial enterprises that engage in the provision of finance or act as financial intermediaries, in reality so far, the Islamic finance industry is almost wholly engaged in the latter activity. This engagement is primarily through banks that operate within the fractional reserve banking system and are governed by ostensibly secular public-sector regulators.

As a result, the Islamic finance industry is banking and debt-focused in nature, and thus lacks the risk-sharing intent of an idealised Islamic economy that is suggested by the contractual structures, *mushārakah* (investment partnership) and *mudārabah* (investment partnership where one party is named the manager of capital). The industry has inherited a conventional banking mindset that largely attempts to reverse-engineer conventional products into Sharī'ah-compliant approximations.

This disconnect between an idealised risk-sharing Islamic economy and the practical reality of Islamic finance activities conducted through banks has resulted in an emphasis on the provision of high-margin Sharī'ah-compliant services – primarily debt-related – to corporates, sovereigns and high-net-worth individuals. These highly profitable services may include, for example, the arrangement of listed debt capital markets instruments in the form of *Ṣukūk*, complex acquisition financing facilities, and structured investment products. At the other end of the customer spectrum, Islamic banking is offered at a retail level to individual customers seeking simple current and savings accounts, home financing products, credit cards and *takaful* insurance policies. These products are low-margin but high-volume.

In the middle of the customer spectrum, small and medium enterprises (SMEs) remain underserved by the Islamic finance industry, since scarce finance origination resources are allocated to low-volume high-margin products or high-volume low-margin products. In addition, at the retail level, a significant proportion of the target market remains unconvinced by Islamic finance. This is sometimes due to suspicion of the permissibility of the products from a religious perspective (often a suspicion driven by the apparent dichotomy of an Islamic bank operating in a conventional fractional reserve banking system), and sometimes because of a lack of awareness of the existence of products that comply with their religious beliefs.

Across the world, some Islamic banks either struggle to convince their target customer base that they represent a truly differentiated value proposition, or indeed are losing the hearts and minds of their target market. In a market like the United Kingdom which is focused on a relatively small demographic, this stagnation is clear and self-evident – the UK has nearly 3 million Muslims, while Al Rayan bank (UK's oldest and largest Sharī'ah-compliant retail bank) had under 80,000 customers in 2015 (Al Rayan Bank 2015). For instance, in the UK, a small number of Sharī'ah-compliant banks sell products largely to Sharī'ah-sensitive investors. The performance of these banks has been poor. Of the five wholly Sharī'ah-compliant banks set up and authorised in the UK in the early 2000s, only one offers retail banking products, and all five have experienced significant growth and structural challenges, leading to the conclusion of the authors that Islamic banking in the UK has failed to deliver on expectations. All five are currently restructuring and "reshoring" their operations as follows:

- Bank of London and the Middle East (BLME) has lost key personnel in the areas of investment and commercial banking, including real-estate financing, and is in the process of restructuring to a private banking model.
- Rasmala plc, formerly European Islamic Investment Bank, has relinquished its permissions from the Prudential Regulation Authority (PRA) and the Financial Conduct Authority (FCA), and has rebranded and "reshored" to focus on regional assets in the Middle East.
- QIB (UK) remains largely a property specialist and has been hit by compliance issues. It is currently restructuring into a private banking model with a wider range of products.
- Gatehouse Bank remains a property specialist and is now changing strategy to focus on the retail market.
- Of the original five, as a fully Sharī'ah-compliant retail bank, only Al Rayan Bank (formerly Islamic Bank of Britain) remains true to its original vision. Its target demographic is relatively small and it operates in a challenging and competitive market. It continues to lobby the UK government to ensure a level playing field versus its conventional peers, especially in relation to tax legislation.

With the exception of Al Rayan Bank, the British Islamic banks have persisted with a conventional banking mindset that has hindered their ability to see Islamic finance as a lubricant for the real economy, based on the Sharī'ah notion of money as a medium of exchange rather than a commodity in itself. Their consistent appointment of senior conventional bankers, often with little or no cultural commonality with their core customer base, has constrained their ability to connect with their target market, and this has consequently limited their performance. Sharī'ah-sensitive customers have voted with their feet and elected not to do business with those who do not buy Sharī'ah-compliant financial products for their own personal portfolios. In addition, a slowness to embrace financial technologies (as is also the case for large conventional banks) has limited their attraction to target demographic groups like millennials.

Furthermore, even though London is touted by senior British politicians as a global centre for Islamic finance with key public support announced by the likes of Baroness Warsi, David Cameron, Boris Johnson and Sajid Javid, the reality is that the hype significantly outweighs the reality. For example, although a limited number of *Ṣukūk* issuances have been listed on the London Stock Exchange within the last few years (three in 2015, four in 2015 and two in 2017) (Sukuk 2019), much of the transaction activity for these issuances takes place outside the UK, and liquidity remains a significant challenge. Similarly, although London is a global centre for conventional fund activity, net assets of Islamic funds in the UK totalled only $728m at the end of 2015 (ICD-Thomson Reuters 2016), or approximately 0.01 per cent of total funds managed in the UK (The Invesment Association 2016).

The withdrawal from Islamic finance of the international banks in London has consequently ended an era of innovation that characterised the growth of this sector a decade ago, and this lack of attention to fundamental research and development is felt keenly elsewhere in the global Islamic banking community.

International banks that once operated dedicated Islamic finance teams have substantially disbanded those teams. In most cases, this was a reaction to the tougher regulatory environment post the financial crisis that forced global banks to prune areas that were not core to their historic business models. Islamic finance is poorly understood at the executive committee and board level of international banks, and is often therefore assigned a risk premium which may not necessarily reflect its true nature. As a result, Islamic finance was seen by many large banks as a luxury to which they could not afford to allocate precious infrastructure (particularly legal and compliance), at a time when regulators were tightening up compliance standards across the board.

The most famous example is HSBC, which offered the Amanah brand to retail customers worldwide until 2012, then decided to close all Amanah customer accounts other than in two markets (Malaysia and Saudi Arabia) (Patrick and Camilla 2012). Other banks that withdrew from the Islamic market included, inter alia, Deutsche Bank (once the driver of innovation in the industry), Barclays, RBS, UBS, Credit Suisse and many others.

If the international banks have suspended their interest in supporting and developing the industry, domestic/regional banks lack resources to fill the innovation vacuum, and the Muslim customer base remains in many cases ambivalent in seeking Islamic banking services over *ribā*-based conventional banking, then the authors contend that the Islamic finance industry has simply not connected emotionally with the target customer base.

The social impact of Islamic finance may be measured in a number of ways, from GDP growth and the Gini coefficient, to how far *maqāsid al-Sharī'ah* (the objectives of Sharī'ah) have been achieved. To date, the empirical literature surrounding the topic is inconclusive – although some studies show that, controlling for various factors, Islamic finance has been conducive to economic growth, other studies conclude the converse (Ahmed 2016).

Perhaps, instead of seeking to measure the social impact of the Islamic finance industry through economic metrics which themselves may sometimes be arbitrary, we may wish to consider the extent to which the industry has met *maqāsid al-Sharī'ah*, and whether it truly delivers the alternative economic model that it professes to. If the banking-led approach to Islamic finance does not meet the *maqāsid* (because, for example, it focuses on debt-based products operating in a fractional reserve model), then is there an alternative approach that aligns more closely with the values and beliefs held by Muslims?

Whether this is due to the political economy under which Islamic finance must operate (i.e. a system of fractional reserve banking where debt financing has many more advantages for the lender) or whether this is a maturing process that Islamic finance must undergo in order to become truer to the spirit of Sharī'ah, remains to be seen. Empirical analysis conducted by Ahmed (2016) confirms the fact that, so far, the impact of Islamic finance has been negligible at a national level on measures of both economic growth and inequality.

The convergence of a number of megatrends leads the authors to propose that financial technology (fintech) which leads to disintermediation may be better suited than the banking industry to achieve the objectives of Sharī'ah. These megatrends include the progress and adoption of emerging technologies, demographic changes and a more socially conscious society. Fintech has the advantage of democratising the provision of finance, disrupting the standard business models of banks and allowing for risk-sharing asset classes to emerge, all three of which are lacking in the present-day model of Islamic banking.

Fintech as an alternative home for Islamic finance

Whilst Islamic banks continue to fly the flag for the Islamic finance industry, alternative industry participants are starting to emerge from the fintech sector. In some cases, the emergence of these new market participants is a consequence of their rejection of the current Islamic banking model, and indeed their failure to find acceptance within the industry.

Broadly, three types of fintech services are emerging that could be argued to align with *maqāsid al-Sharī'ah*, and therefore the core values of the Muslim customer. These three types of services are: (1) certain types of cryptocurrencies; (2) investment platforms like crowdfunding or other non-bank technology-based funds, and peer-to-peer financing; and (3) other fintech platforms offering digital services such as digital banking or remittances and money transfer. Whilst the first (cryptocurrencies) have no direct relationship with the Islamic finance industry, they may nevertheless (in some cases) accord with Islamic notions of money as a medium of exchange. Investment platforms are specifically tagged as Sharī'ah-compliant to attract Muslim customers. We will briefly explore both cryptocurrency and non-bank fintech platforms in this chapter.

Cryptocurrencies

If the Islamic banks have yet to gain universal acceptance amongst Muslim customers, to some extent this is a function of the enforced nature of their business model, one that is regulated by conventional central banks and must exist within a fractional reserve system. As a result, their modus operandi is similar to that of conventional banks: the creation of credit in proportion to deposits. The internal corporate culture of Islamic banks is also largely derived from their conventional counterparts. Indeed, many of the most senior bankers at Islamic banks have spent the majority of their careers in conventional finance. The nature of money itself is thus rarely a consideration in the creation of financial products at Islamic banks. Money is rarely viewed in its Islamic context, that of a medium of exchange rather than a commodity to be traded.

Nowhere is this more evident than the prevalence of commodity *murābahah* and *tawarruq* products as a mechanism for credit creation: many commentators have expressed concern that these are merely an overly complicated proxy for interest-like loans (Islamic Finance 2010). Similarly, the majority of *Ṣukūk* issuances with an apparent asset-backing (such as the sale and leaseback of real estate) are structured as senior unsecured debt obligations of the issuer's sponsor, rather than as true securitisations of underlying real assets.

Ironically, a radical solution to the inherent flaws of infinite, printable money that can be manipulated by a centralised authority has emerged from the non-Muslim world. Some cryptocurrencies appear to address the flaws in fiat currency in a manner that accords closely with Islamic values. If the gold dinar is considered to be a standard bearer for an Islamic form of currency, then certain cryptocurrencies, such as Bitcoin, exhibit many similar characteristics.

According to some scholars, Bitcoin, for example, has the characteristics of *māl* (wealth) and *taqawwum* (legal value), and critically may also have *thamaniyyah* (currency attributes) (Adam 2017a, 2018b). Scholars who hold this view argue that Bitcoin was established as a peer-to-peer payment system and therefore established and used as currencies as a result of *istilah* (social concurrence) from the outset, and thus demonstrate *thamaniyyah*. They consider it *māl* and *taqawwum*

because it has desirability (since it is decentralised and independent) and storability (through the distributed ledger).

Bitcoin shares certain characteristics of gold as a currency since it is inflation proof, decentralised, divisible, scarce and finite. It has several additional beneficial qualities that gold does not have, like utility as a currency (exponentially improving all the time), anonymity, speed of transfer, is non-counterfeitable through blockchain, more resistant to theft (if properly stored, but this remains open to current debate), open-source and durable. It is thus sometimes referred to as Gold 2.0. Fiat currencies have none of these attributes, other than that they are accepted as currencies.

What brings certain cryptocurrencies even closer to the Islamic concept of money is that if a currency cannot be printed or created from thin air by loaning it against deposits, and it is finitely bound by its algorithm and secured by its blockchain, then it has no need of banks. If all the world transacted with such a currency, banks would not be able to create new money, since first they would have to mine it or earn it. Thus, they cannot loan new currency to borrowers, and credit can only be advanced via underlying real assets. *Ribā* would be commensurately much less prevalent.

Despite the manifest alignment between certain cryptocurrencies and the Islamic concept of money, the Muslim world has been slow on the uptake. They have not been helped by misinformed *fatāwā* from senior scholars, such as the Grand Mufti of Egypt, Shaikh Shawki Allam, who issued a *fatwā* ruling against the trading of Bitcoin, and thus supporting an earlier ban by the Egyptian government (Ahram Online2018; Irfan 2018). As the reader will learn later in this book in Chapter 9 on Bitcoin by Mufti Faraz Adam and Mufti Abdul Kadir Barkatulla, there are aspects of Bitcoin and other cryptocurrencies that may be inherently suited to an Islamic monetary system.

Whether Bitcoin succeeds or not remains to be seen, but the concept of blockchain as a distributed ledger and the cryptocurrencies that leverage off this technology platform may represent a profound financial revolution that accords with *maqāsid al-Sharī'ah*, without so much as one Islamic bank being involved. That, in itself, may be indicative of the lack of vision and dynamism in today's Islamic banking industry, and why alternative tech-based platforms may yet succeed in implementing the Islamic economic model.

Fintech as a non-bank intermediary platform

The rise of financial services conducted through electronic platforms continues to lessen the traditional role of financial intermediaries such as banks. The ubiquity of the smartphone, for example, allows access to retail financial products on an unprecedented scale. Similarly, whilst small and medium enterprises lack access to funding via traditional channels, technology has the power to standardise due diligence and contracts in order to accelerate the provision of venture capital to them. Although conventional venture capital and angel investing

have found a foothold in conventional (non-Islamic) finance, there are very few examples of Sharī'ah-compliant venture capital conducted through e-platforms.

Structural constraints at the industry level that encourage the provision of either high-margin investment banking services or high-volume retail products open the door to fintech, since e-platforms are inherently suited to act as a financial intermediary for a standardised product. We are starting to see the emergence of such platforms for Islamic equity crowdfunding. Beehive in the UAE and Ethis Ventures in Southeast Asia are two such examples.

Many of the constraints and challenges facing Islamic finance can be mitigated with fintech. What drives the "reverse engineering" of so many conventional financial products into their Sharī'ah-compliant counterparts? Consider a simple model that captures the regulatory impact of capital under the Basel banking regulations: under debt financing a bank would need £8 for every £100 lent out; conversely under an equity contract of £100 of investment, 4 times as much capital would be required (Gassner 2012). Why would a rational bank advance finance via equity contracts if they can earn substantially more through debt financing? Moreover, Gassner (2012) states that "[i]nterest is deductible as cost for a company, while profits are paid out after corporate tax is being paid. The optimum rate of debt in a firm is therefore 100 % debt anyway". One view then is that Islamic finance operates in an entrenched financial and legal status quo, where wholesale change is unlikely to take place.

Islamic principles-based fintech platforms do not come with the shareholder- and regulatory constraints associated with a traditional bank and thus can be more niche in their offering – a plethora of crowdfunding platforms have emerged that bypass traditional financing, allowing for the ability to invest, donate or raise funds online.

In the investment space for instance, Yielders – a UK-based, property crowdfunding platform – offers individuals the ability to invest into portions of a property, yielding rental income and capital gains on a proportion of the final sale. Ethis Crowd goes one step further in their innovative use of different Islamic financial contracts for the Indonesian market. Real-estate developments can be financed through the platform using crowdfunded e-*wakālah* – an agency contract – or crowdfunded *istisnā'* – a contract to construct an asset. Finally, Wahed Invest is the world's first Sharī'ah-compliant robo-adviser, allowing investment into pre-screened funds through algorithmic trading.

Such niche offerings are the first of their kind, and nor do the authors expect traditional Islamic banks to match this level of innovation due to a conservative banking culture and a product offering that is primarily debt-based. Non-bank disintermediation and the disruptive power of technology is promising a radical new approach to the creation of Sharī'ah-compliant products.

Fintech platforms are often able to short-circuit the challenges of contract standardisation and therefore, by association, that of Sharī'ah compliance faced by banks. Whilst some platforms place the onus of Sharī'ah certification on the consumer – as is the case for LaunchGood and many other donation-based

platforms – firms like Ethis Crowd have an internal team of Sharī'ah experts overseeing their procedures, and operating under standardised investment contracts, thus reducing the need to certify each and every new investment (subject to basic filters). This approach further allows non-bank intermediaries the benefit of lower costs and the ability to innovate.

Perhaps disappointingly, the structure chosen by Beehive for peer-to-peer lending is the commodity *murābahah* which is inherently a debt-like product rather than a risk-sharing instrument like *mushārakah* or *mudārabah*. The question remains, therefore, whether the target customer demographic will ultimately be convinced that this type of financing product meets an acceptable standard of risk-sharing within the Islamic economic model. It would not be a difficult task to create a standardised risk-sharing contractual structure so as to allow for a variable rate of return and a more equity-like product.

Naturally, a certain degree of due diligence must be deployed at the platform level, such as compliance checks and business suitability. However, to a large extent, investment due diligence has been shifted from a traditional financial intermediary (like a bank) to the investor. This method of financing SMEs is thus inherently suited to an e-platform due to the speed and ease with which financing can be raised.

Nevertheless, there exist models of peer-to-peer financing that have not gone down the route of *murābahah*, but these are primarily philanthropic endeavours. The structure employed by EdAid for university students to raise funds for their tuition is through human capital *mudārabah*. Supporters pay for a student to go to university and lay claim to a percentage of postgraduate salaries for 10 to 20 years, until they are fully paid back. This is inherently risk-sharing in nature because a graduate may not earn as much as they were given or may remain unemployed. Nevertheless, the EdAid model projects that the majority of its supporters will receive their money back, and at the same time enable students to access education.

Combining fintech and the Islamic economic model

The attractiveness of fintech solutions based on Islamic principles comes from its accessibility, scalability and convenience. Its convenience is manifest: technology allows the consumer to access financial services any time, any place. From an industry point of view, fintech is accessible because the industry can grow without the traditional constraint of lack of human capital in Islamic finance. Anyone with a product idea is able to set up a fintech solution, at a fraction of the cost of a traditional Islamic bank – the authors work with university students creating challenger Islamic banks at one end of the spectrum to industry veterans launching a peer-to-peer (P2P) platform at the other. Finally, fintech solutions based on Islamic principles have the potential to be massively scalable. Ethical and Islamic offerings can overlap to some degree, and are increasingly attractive for Muslims and non-Muslims alike. Once again, the authors work with a number of fintech platforms with either a substantial or even majority non-Muslim user base.

Demand for fintech solutions based on Islamic principles continues to rise as consumers begin to see the value of more niche financial product. EY predicts that over 150 million new banking customers will be onboarded over the next 3 years due to fintech. Although the authors are bullish on the potential for fintech solutions based on Islamic principles, the reality is that the industry is very nascent, with the core demographic underserved: in 2017, less than 3 per cent of global venture capital was invested in Muslim countries (Lawrence 2017).

If the Islamic finance industry is to implement a practical model that tends towards an ideal Islamic economic model and leapfrogs traditional finance, then it must also address not-for-profit concepts such as *waqf* and *zakat*. We are starting to see organisations emerge, such as the UK's National Zakat Foundation, that institutionalise the collection of *zakat* online. Human Crescent, a platform that raises *sadaqah* and *zakat* for refugees is another such organization. By collaborating with industry giants like The Global Fund and Awakening Media, they aim to raise $50 million to fund the emergency healthcare gap for refugees worldwide.

Looking further out into the future gives us the potential to hypothesise how newer emerging technologies like blockchain could further revolutionise the wider Islamic economic model, by recording and auditing donor contributions across the supply chain. Currently in development, the International Federation of Red Cross and Red Crescent Societies (IFRC) and AidTech have recently won an award for their innovative blockchain application that gives organisations the ability to track their contributions in highly complex humanitarian settings through the blockchain, providing transparency and trust. Indeed, estimates state that the cost of services in Islamic banking could drop by up to 95 per cent through the use of smart contracts and an "immutable record of ownership and assets", i.e. the blockchain (Lawrence 2017).

We are also starting to see the emergence of social-impact investment vehicles that are Sharī'ah-compliant. Such organisations and vehicles are ripe for implementing blockchain and crowdfunding technologies. Fintech can therefore be a powerful catalyst for the wider Islamic economic model, especially since millennials are more likely to embrace both technology and social impact/environmental, social and governance (ESG)-compliant investing models which have greater relevance to the wider *maqāsid* than the traditional Islamic banking model.

Conclusion and next steps

After the birth of the modern Islamic finance industry in the 1960s and 1970s, and a subsequent exponential growth in the early 2000s, Islamic finance has retrenched and its growth has stagnated. Partly this can be explained by a global slowdown in financial services generally, but partly also because the Islamic banking industry has struggled to connect emotionally with its target customer base. Is adoption of financial technology and the consequent democratisation of

financial intermediation the catalyst Islamic finance needs to rediscover its lost momentum? The authors strongly believe so, but with caveats.

If Sharī'ah-compliant fintech follows the Islamic banking model of reverse-engineering conventional products, it may be doomed to mediocrity from the very start. Whilst the products of Islamic banks are intended to be a form of alternative finance, the corporate culture of Islamic banks and mindset of their staff is typically as mainstream as that of conventional banks. Prospective customers, especially millennials, intuitively realise there is an inherent cultural problem within the Islamic banking industry, even when those prospective customers lack technical understanding of finance.

Millennials are predisposed to considering new ways of social interaction and new technologies. For them, fintech and ethical financing – in the form of socially responsible investments or ESG – are powerful ideas. If such concepts are seeded at the ground level today by forward-thinking companies, then the authors believe fintech has the power to overtake conventional banking models. Marrying Sharī'ah principles to fintech solutions has the added attractiveness of ESG-style solutions and social inclusiveness, and a greater likelihood of achieving the objectives of Sharī'ah. If fintech solutions in Islamic finance contain a set of universally recognised values across different cultures and creeds, then surely it can attain the momentum it needs to become mainstream.

Governments around the world have recognised that fintech companies require a nurturing ecosystem to survive their brutal infancies. Sharī'ah-compliant fintech is even more challenging since it does not have the familiarity of its conventional peer group. Governments of Muslim nations such as Malaysia, the UAE and Bahrain have started to recognise this by creating their own regulatory sandboxes and other initiatives to incubate Sharī'ah-compliant digital firms. Even the UK has started to follow suit through the creation of the UK Islamic Fintech Panel.

As policy barriers and infrastructural issues are resolved, just as they were for the Islamic banking industry, the authors believe financial technology will once again catalyse the Islamic finance industry and, more widely, the Islamic economy. A rejection of the banking model by these new players, as well as a closer alignment with *maqāsid al-Sharī'ah*, could prove to be the coming of age for Islamic finance.

As the prominent scholar Mufti Taqi Usmani states:

> It was expected that Islamic banks would progress in time to genuine operations based on the objectives of an Islamic economic system, and that they would distance themselves, even step by step, from what resembled interest-based enterprises. What is happening at the present time, however, is the opposite.
>
> *(Usmani 2007)*

Combining fintech and the Islamic economic model has the potential to finally create genuinely impactful solutions adhering to *maqāsid al-Sharī'ah*.

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3

IMPLICATIONS OF TECHNOLOGICAL ADVANCE FOR FINANCIAL INTERMEDIATION IN ISLAMIC FINANCE

Rodney Wilson

The increasing pace of technological advance has major implications for how Islamic financial services are delivered, with significant implications for staff and their clients. The effect is equally destructive for conventional financial services, with threats of closure of branch offices as clients increasingly transact their businesses online rather than face to face. The revolution not only affects payment services by reducing the need for checking facilities, but also extends to credit allocation, debt monitoring and asset management (Dapp and Slomka 2015). Initially, the threat has been to less skilled and lowly paid back-office processing jobs, but it now extends to more senior executives who have to adapt their work practices to technological innovation or face termination of their contracts and often early retirement (Skan et al. 2015).

The major impact of technological change on Islamic banking so far is on the payments systems. With customers visiting branches less often, this undermines bank transaction deposits as platforms for cross-selling wealth-management products. However, staff savings more than compensate for this potential loss of revenue. The substantial investment needed in technology favours larger rather than smaller Islamic banks. There is little doubt that Islamic banks with strong brand recognition will survive disruption. However, there is potential for smaller challenger banks to form alliances with software companies for mutual gains (Arner et al. 2015). Independent boutique wealth managers may also increase in importance.

The added complexity of Sharī'ah-compliant finance does not exempt Islamic banks from technological disruption. Islamic account holders also make fewer visits to branches, relying on smartphone and tablet apps and web-based online services for everyday transactions. As a consequence, Islamic banks need to employ more IT staff and fewer administrators with an increasing emphasis on software skills for the remaining professionals employed. Explanations of the

features of particular Islamic financial products are increasing provided on websites rather than during arranged interviews, with existing or potential clients using web-based calculators to work out the monthly repayments for different types of Islamic finance.

Sharī'ah assurance and financial technology

Fintech encompasses many areas of banking and financial services. These include payments systems such as Google Wallet and Apple Pay which have the potential to replace many of the retail services that are a particular strength of Islamic banks. Disruptive technology can also threaten equity finance, including that delivered by Islamic funds, with crowdfunding providing a lower-cost alternative. Rather than perceiving such innovative practices as a threat, a more positive approach is to view them as an opportunity for existing Islamic financial institutions (Mahalingam 2017). They could partner some of the new payment providers with mutual benefits as the Islamic banks provide the Sharī'ah assurance while the fintech companies provide efficient low-cost payments services. Furthermore, as there are some similarities and compatibilities between crowdfunding, *mudārabah* and possibly *mushārakah*, new types of Islamic financing could be offered at very competitive cost. Exploratory research could be instigated in these areas by Islamic finance specialists, possibly in collaboration with Sharī'ah scholars who could provide inputs as the work advances.

Given the disruption resulting from technological innovation, there needs to be continuous monitoring of existing Islamic financial products by Sharī'ah boards to ensure they do not deviate from the approved templates. Monitoring can be undertaken by internal Sharī'ah audit staff by random sampling of the contracts to verify compliance. It would be too time consuming and costly to examine every contract, but as long as the audit staff have unrestricted access to all contracts, and the sampling is representative, there is no need to go further. Any irregularities should be reported by the auditing staff to the Sharī'ah board for discussion and action. Pamphlets and website material on Islamic financial products should also be subject to scrutiny. All new products introduced by Islamic financial institutions or substantial revisions to existing products should be subject to Sharī'ah-board approval before they are offered to customers.

There is no single "ideal" *maslahah*, as Islamic scholars inevitably have different views on what is meant by public interest. The concept has evolved over time as economic and financial factors have changed. Given the diversity of Muslim majority countries in terms of stages of development and economic fundamentals, it is inappropriate to argue that there is a universal *maslahah*. This is especially the case with fintech, which inevitably brings disruption to financial services. Islamic scholars need time to assess the implications for *maslahah* and provide considered opinions.

The views of Islamic economists on the role of money in an economy, and indeed what constitutes money, is an example of an area where Sharī'ah guidance

is confused. Referring back to the historical experience in the Islamic world is interesting, but not very relevant to the modern age of electronic payments and new currencies such as bitcoins, the accounts of which are maintained by private unregulated companies in computerised ledgers. Bitcoins are still in their infancy and how acceptable they become remains to be seen (Meiklejohn et al. 2013). This will depend on the success of bitcoins in attracting long-term investors, as at present many of the investors are day traders whose activities are highly speculative. From an Islamic perspective much of their activity is *haram*.

Types of money change however, with gold and silver having been replaced by paper money, which in turn has been replaced by bank deposits. Islamic finance has been able to accommodate these changes, with Islamic banks accounting for a significant proportion of the money supply in the Gulf Cooperation Council (GCC) countries and Malaysia.

The major resistance to bitcoins is because of their unstable value in terms of other currencies. Islamic scholars have no particular views on exchange-rate systems. Some Muslim majority countries, notably in the GCC, have fixed exchange rates with the United States dollar; others float or are fixed against other currencies, such as the Brunei dollar which is at parity with the Singapore dollar. Expect to see more diversity in currency regimes as the global economic rankings change, but this presents opportunities for Islamic investors who can hedge their currency assets to match their currency liabilities.

Competition and technological change

Islamic banks compete with other Islamic banks for deposits, with a key aim being to encourage customers to have their monthly salaries paid electronically direct into their bank accounts. It is the provision of personal banking services that has accounted for much of the success of Islamic banks. Transaction deposits paying no interest are a cheap source of finance for Islamic banks, the main cost being that of administrating the accounts and providing associated services. The accounts also provide a platform for selling more profitable financial services such as Islamic mutual funds and *takāful* (Islamic insurance), either provided by the Islamic bank or by third parties. In this latter case, the third party pays a fee to the Islamic bank for the business generated.

Data-management technology can reduce the cost of servicing transaction accounts. To enhance convenience, all of the clients' financial products can be accessible from the transaction account's home screen, including links to third parties using compatible software systems. The Islamic bank becomes an integrated financial supermarket accessible interactively by the client. It is of course expensive to develop such systems, whether by in-house IT staff or outsourcing. Investment in technology encourages client loyalty and reduces the likelihood of customers shopping around for different financial services.

The overall effect of new technology on Islamic finance varies from market to market and depends on what proves popular with clients (Deloitte 2017). The

demographic profile of Muslim communities favours youth, who are more likely to be tech savvy and receptive to internet banking and finance (Gulamhuseinwala et al. 2015). However, the young also have less money and fewer financial assets. Their main interest in Islamic banking is transaction account services, vehicle finance and Sharī'ah-compliant mortgages. As they have less wealth than older generations, their interest in Islamic asset management is limited.

Whether technological change in the provision of financial services has the potential to increase competition is debatable. It can bring cost savings if the wages bill is reduced with fewer employees. This can result in fee reductions which benefit clients, but it is important to note that the upgrading of technological systems is expensive, and ultimately it is the clients who pay for the innovations. Furthermore, in many of the economies where Islamic finance is most developed, the salaries of bank employees are comparatively low, so keeping branches open and maintaining employees is less expensive than in high-income economies.

Economies of scale and scope are facilitated with online platforms which can serve millions of clients (Kim 1986). There are few Islamic banks which have millions of clients however, and it is much costlier per customer to provide technological intensive financial services when there are at best thousands rather than millions of clients (Yudistira 2004). Newly established Islamic banks face high entry costs, given client expectations regarding the necessity of technologically intensive financial services. Usually there is an oligarchy of existing players providing well-established technological services, which is expensive to replicate (Hassan 2006).

Islamic financial institutions which only provide Sharī'ah-compliant services often complain about unfair competition from so-called Islamic windows of major conventional financial institutions (Kamaruddin et al. 2008). In 2011, the Qatar Central Bank ordered the closure of Islamic windows in conventional banks, but elsewhere they continue to operate (Shaheen and Regan 2011). In November 2016 the Reserve Bank of India proposed the opening of Islamic windows to ensure the Muslim population of the country were not excluded from the banking system because of their religious beliefs (PTI 2016) – a move which has since been abandoned, as of November 2017 (PTI 2017). The concern with Islamic windows is that designated Islamic deposits could be used to fund usury (*ribā*)-based lending. Rigorous financial reporting to ensure that there is no co-mingling of funding can answer this concern. There are, however, wider issues of cross-subsidies which expensive information technology provision may exacerbate. It would be going too far to suggest that Islamic deposits should be only accessible from separate ATMs or online services through dedicated Islamic portals. The challenge is that the costs of technological provision per customer are much lower for conventional financial institutions with millions of clients than for Islamic institutions with a much smaller client base. With fintech, there are high fixed costs, but low variable costs. This distorts competition benefiting Islamic windows at the expense of dedicated Islamic financial institutions.

Staffing implications of the automation of financial processes

Most of the changes with automation of financial processing involve changes to work practices, in particular eliminating routine clerical tasks (Hunter et al. 2001). For example, interviews and form filling by bank staff have been replaced by web-based input from clients or their financial advisors. This has reduced personal contact time, but arguably filling up forms is a less productive use of staff time which can be better devoted to a more interactive and explorative session with clients and potential clients. This can include in-depth advice on Islamic financial products to ensure the clients are aware of the options available. There is the issue of what product is most suited for a particular purpose, which requires professional advice.

Process automation has major implications for employment practices in Islamic finance and inevitably employees find the new demands from their organisations challenging. Re-skilling and enhanced training are imperative for staff to be able to respond to changing needs with new technology. Significant investment in human capital is needed if those working in Islamic financial institutions are to cope with more demanding employment conditions. Many Islamic financial institutions operate in relatively low-wage environments, where, as already indicated, it is cheaper to maintain the branches network than in more mature economies with higher wages. In these circumstances, there is less pressure to automate and raise employee productivity (Bashir 2003). In the GCC countries where Islamic finance is most developed there are complications arising from the dual characteristics of the labour market. Islamic financial institutions employ both local citizens and expatriates. The expatriates can only be employed on fixed-term contracts. Although these contracts can be extended and renewed there are understandably increasing pressures to employ local citizens given the youthful demography of the GCC and the need to absorb local graduates into the workforce. Hence, training places are increasingly reserved for local citizens, as there is less incentive in investing in expatriate workers whose contracts have less than three years to run (Harry 2007). Even the Sharī'ah boards used to employ foreign citizens, but virtually all are now exclusively local apart from in the UAE.

Investment in training for expatriates can be more profitable for Islamic banks with overseas affiliates or subsidiaries. For example, Dubai Islamic Bank has a subsidiary in Pakistan offering similar services with compatible technological systems to those provided in the UAE (Wilson 2013). Some of the staff that had been previously employed in the UAE were subsequently transferred to the Pakistan subsidiary. There they play a leadership role, including training local staff, transferring the skills acquired in the UAE. To a more limited extent, similar skill transfers have also benefited the Turkish subsidiary of Kuwait Finance House and the Malaysian subsidiary of Al Rajhi Bank. There are however much fewer Turks and Malaysians working in the GCC than Pakistanis,

partly reflecting demography and plentiful employment opportunities in Turkey and Malaysia.

Customer empowerment through technological advance

An important aspect of technological advancement in financial services is the empowerment of customers who have greater knowledge of finance than ever before. This also applies to users of Islamic financial products who are highly motivated to learn more about the subject, both from personal interest and religious conviction. There is a wealth of information on the web concerning Islamic finance which is available to everyone. Rather than relying on Islamic financial institutions to recommend the most suitable deposit, financing or asset management products, interested clients can do their own homework, investigating through the web what is best for their needs (Guru et al. 2003). When they go to meetings with Islamic financial service providers, clients are increasingly armed with relevant information with which to appraise or even challenge suggestions made by frontline staff, including marketing executives. Approached positively, this can result in better-informed discussion and a deeper analysis of clients' requirements and how these fit with the institution's financial priorities. In other words, less time is spent on preliminary discussion, with conversations being more focused from the start.

The wealth of information readily available from online resources can facilitate risk-sharing, a fundamental principle in Islamic finance. Informed decision-making reduces risks arising from ignorance of the facts and complies with the Sharī'ah teaching to reduce or eliminate avoidable uncertainty designated as *gharar*. Being able to have financial information 24/7 in real time facilitates continuous monitoring of balances and transactions by Islamic financial institutions and their clients. The latter can easily monitor payments from their customers to ensure these are timely. Clients can ensure they have sufficient liquidity to cover future payments, with information-technology systems providing advance details of forthcoming receipts and outgoings.

Much Islamic finance is transactional with low-risk short-term instruments, notably *murābahah*, being dominant (Khan 2010). Many clients would welcome longer-term financing with financial institutions taking on more risk, as is the case with *mudārabah* and *mushārakah*. It is still unclear whether technological innovation in Islamic finance can widen the choice of financing instruments offered to clients, or reinforce the current narrow focus and restricted choice. The reluctance to offer *mudārabah* and *mushārakah* finance has been attributed to concerns by Islamic financial institutions with moral hazard and asymmetric information. It is asserted that the client has better access to information than the financier. Collecting and monitoring data is time-consuming for financial institutions which are reluctant to commit significant human resources to the task after the initial financing is agreed. The longer the time period and the greater the risk, the more the resources that have to be committed to surveillance, increasing the cost for the Islamic financial institution.

Automation of data collection and interpretation

Better information-technology systems can reduce data monitoring costs, and even some of the data interpretation tasks can be automated, with signals sent to the financial institutions when agreed parameters are breached. The viability of *mudārabah* and *mushārakah* as financial instruments may depend on trigger points being identified and incorporated into the contracts and related information which the parties must agree (Mansoor Khan and Bhatti 2008). This goes beyond identifying and reporting payment failures to collecting ongoing information on the receipts which cover the servicing payments. Any changes on the prospects of a default on repayments can also be built into the system, with such an exercise undertaken perhaps 12 months before the repayments date.

Technological advance which enhances risk management can facilitate the usage of financial instruments long advocated by Sharī'ah scholars, such as *mudārabah* and *mushārakah*. It can also address the unsatisfactory restructuring associated with financing methods such as diminishing *mushārakah* which damage their Sharī'ah credibility. Diminishing *mushārakah* is a partnership financing method which is mostly used for Islamic mortgages. The client and an Islamic bank jointly purchase a property and the client pays rent to the bank for the share of the property it owns, usually 80 or even 90 per cent initially. The bank's share of the ownership diminishes over time as the client makes monthly repayments in addition to the rent. This provides a safe exit route for the bank, which is repaid in full for its share of the initial purchase (Meera et al. 2009).

The Sharī'ah compliance concern is that *mushārakah* is classified as an equity contract, but diminishing *mushārakah* in practice is a debt-contract subject to default risk but not market risk-sharing. The amount the bank is repaid is equal to its purchase payment, while the client bears all of the equity risk. This arrangement is admittedly favoured by many clients, as they anticipate the value of the property will rise over time and they are unwilling to share any capital gains. However, if property markets decline, the client may find the debt exceeds the value of the building – a result described as negative equity.

Better access to financial data might encourage Islamic banks to share in the market risks with *mushārakah*. Periodic independent property valuations incur fees, but this may be unnecessary if the value of the property is automatically linked to price indices for the area in which the property is located and the selling prices of equivalent property. Provision for market risk-sharing could be included in diminishing *mushārakah* contracts reducing the likelihood of negative equity for the client. The Islamic bank will of course be more exposed, but by using locational data it can rebalance its property portfolio to areas where prices are more buoyant and less volatile.

Technology to enhance investor decision-making

Investor decision-making and subsequent actions have been greatly empowered by technological advancement (Rose et al. 2004). This has increased the

efficiency of securities markets by providing comprehensive information and more secure brokerage systems. With settlements being made instantaneously there is no delay between purchasing and selling orders for securities being issued and the execution of transactions. Long gone are the days of telephoning a broker to transact a deal and being promised the best available rate the following day. Today virtually all brokerage is conducted online with the client making purchasing or sale orders from a computer, tablet or smartphone. They are given a few seconds to confirm the order, otherwise it will be cancelled. Often clients will be following the prices of the securities on a different screen and in making their decision whether to confirm they have to decide themselves if their offer is best. Of course, if they do not confirm, the clients may lose the opportunity to deal at a favourable price point, so they have to assess whether price trends are in their favour or not. Responsibility for getting the best price has therefore shifted from the broker to the client.

Online brokerage for purchasing and selling securities is extremely competitive, substantially reducing dealing costs (Looney et al. 2008). This could encourage short-termism and so-called day trading, but Sharī'ah scholars see such activities as being highly speculative and contrary to the principle of participatory finance and risk-sharing. Islamic institutional investors such as Sharī'ah-compliant fund managers or *takāful* operators have long time horizons for investments and conduct research on the companies they invest in rather than simply focusing on prices on a screen.

When conducting research, investors can rely on the information and data provided by brokerage firms or independent investment advisory companies. Investors can access through their brokerage website graphs of price trends, data on revenues and performance, press releases and even complete annual financial reports on the stock they hold or are interested in acquiring. Those not having the time or the confidence to analyse all this information can engage investment advisors to undertake the work on their behalf, but even in this case much of the contact with the advisory firm will be online.

The procedures for ensuring that stock is Sharī'ah-compliant has also become automated, with the financial- and sector-screening determined using software programmes. Various methodologies have been developed to analyse corporate data to distinguish *halal* (permissible) from *haram* (impermissible) investment. The Sharī'ah scholars make the final decisions, but their opinions are sought only on borderline cases, as there is no need to investigate further companies which are clearly *haram*, such as brewers or distillers, or those which are obviously *halal*, such as most manufacturing firms (Derigs and Marzban 2008).

Technological innovations and Islamic fund offerings

Most Islamic funds are actively managed rather than being passive funds that simply track Sharī'ah-compliant indices. Fund managers constantly review the financial performance of their investment portfolios, while the scholars serving

on Sharī'ah boards actively respond to requests for guidance from the fund managers on existing holdings or potential acquisitions (Ghoul and Karam 2007). Information technology facilitates the research of both fund managers and Sharī'ah-board members and the available tools of analysis improve the quality of the research. Clients are often unaware of quality enhancement, however, and would prefer technological innovation to save on labour and costs, reducing the admittedly rather high management fees charged by Islamic funds.

Although most Islamic funds are actively managed, as with conventional funds, clients are increasingly diverting investment to passive funds which have much lower management charges (Cremers and Petajisto 2009). Passive funds only became viable through advances in information technology and powerful data-processing capabilities. Rather than a fund manager making decisions on when to buy and sell securities and the amounts to transact, this input is automated. No longer are fund managers needed, as discretionary decision-making is eliminated, with passive funds entirely managed by computerised systems. Active funds attempt to outperform the market, yielding sufficient profit to cover management charges while providing reasonable capital gains for their investors. This is a considerable challenge, and not surprisingly many active funds fall short, with clients still liable for high management charges even when the funds underperform the market or make losses. Such practices explain why many argue that active asset management is in terminal decline.

Passive funds simply track indices with portfolios automatically rebalanced to reflect the performance and weightage of the securities comprising the index. There is no need to include all the stock represented in the index if simulations show that a subset accurately reflects index performance. This reduces transaction costs. Where the performance of the subset deviates marginally from that of the index, derivatives such as futures or options can be used to improve the correlation. The investors' concern is simply that the value of their investment reflects movements in the index, nothing more or less.

What are the challenges with passive funds from an Islamic perspective? Obviously, they should not track conventional indices which include stock such as *ribā*-based banks, breweries or distilleries, all of which are *haram*. There are, however, well-established indices such as the S&P Dow Jones Islamic Market Indices which only include Sharī'ah compliant stock (Abdul Rahman et al. 2010). The performance of these indices has often outperformed conventional indices, as highly leveraged stock is excluded, which reduces risk. Furthermore, in the aftermath of the global financial crisis of 2008 when the stock prices of conventional banks were crashing, Islamic indices were largely unaffected, as they did not include these stocks.

Risk-sharing is an important principle of Islamic finance, not least as it provides a justification for reward (Askari 2012). Most actively managed Islamic funds involve equities, with investors sharing in the portfolio risks rather than the risks associated with individual listed companies. The competency of the fund manager will also determine the risks facing the investors. Passive tracker

funds are inherently different, as investors cannot share risks with a computer. Nevertheless, there remains a degree of risk-sharing, as investors are sharing in the risks measured by the index which reflects the stock prices of the firms which are the constituents of the portfolio. As indices comprise leading companies, the portfolio is dynamic, with firms constantly entering and leaving. Obviously, risks are only shared as long as firms remain in the portfolio. This limits downside risk for the investors. It can be argued that the risk-sharing is asymmetric, with investors benefiting from the upside with increased weighting of successful companies in the portfolio, while on the downside risks are reduced by falling weights and exits.

Exchange-traded funds are a variant of index trackers, the development of which would not have been possible without major improvements in data-processing technology (Kosev and Williams 2011). Passive tracker funds, like their active counterparts, can only be bought or sold daily or weekly. In contrast, exchange-traded funds can be purchased or sold in real time throughout the day or night. Purchase orders can be processed at any time, provided there are sellers and the fund itself has liquid balances to satisfy selling orders. This speeding up of transactions facilitates buying and selling by day traders, who can take short term positions with respect to how they predict the index will move. Often positions are covered by call, or put options or transactions in derivatives such as futures.

From a Sharī'ah perspective, there are doubts about whether investing in exchange-traded funds is legitimate. They are legitimate insofar as the investment is in real assets such as equities in listed companies involved in *halal* activities. However, many exchange-traded funds purchase and sell financial derivatives to enhance index tracking and provide liquidity. The markets where the derivatives are traded are, however, highly speculative and therefore best avoided by Islamic funds. This also applies to hedging instruments using trigger points for purchases and sales. Hedge-fund investments have been approved by a few Sharī'ah scholars, but most view them with suspicion, especially as they lack transparency (Chapra 2008). Although it is beneficial to open as many asset classes as possible to Islamic investors so that they are not disadvantaged in comparison with other investors, Islamic hedge funds may be one step too far (Reuters 2010).

Disruptive consequences for asset managers, brokers and financial advisors

It is evident that technological innovation is challenging for the management of Islam financial institutions and the disruptive effect goes far beyond junior employees. Many of the skills and attributes highly valued in the past count for little given changed job descriptions. Highly valued attributes such as client empathy are degraded with infrequent face-to-face contact and less emphasis on building and retaining relationships. Networking skills are less valued, even though these were what encouraged many to pursue careers in Islamic finance

where institutional loyalty and solidarity were seen as core values. With new financial technology qualitative attributes are replaced with quantitative skills with an emphasis on logic. It is not merely that the number of jobs declines, but that the nature of the tasks performed shifts markedly. The demand is for employees with advanced information-technology skills and not general administrators. Technological change may reduce the number of frontline staff, while back-office functions are increasingly the responsibility of financial software specialists.

With technological change, the focus is on lowering management charges which inevitably is at the expense of service quality. Workload and responsibility are transferred to clients and their advisors. Financial advisors focus on high net worth clients while those with modest investment funds are forced into relying on information technology. There is a depersonalisation of brokerage, with buying and selling of securities undertaken online by clients. Those wanting more than execution-only services are obliged to pay up-front fees, although some may welcome the increased transparency with these fees. The alternative is to use tied advisors, but although they do not collect fees from the client, they receive payments for signing clients up for the purchase of Islamic funds or *takāful* products. The amounts of these payments are not disclosed to clients.

It is debatable whether technological change in finance widens or restricts client choices. It increases the product offerings, such as tracker and exchange-traded funds, but also adds complexity. Highly financially and computer-literate clients have more choices than those who struggle to understand the products and largely rely on their financial advisors. Awareness of Sharī'ah compliance issues can be fostered by websites or word-of-mouth. There is potential for Islamic finance chat lines and Apple's Siri-type guidance and robo-advisors. Those who want to buy or sell Sharī'ah-compliant securities in the UAE online can now use Islamic brokerage services. Emirates Islamic Financial Brokerage (EIFB), a wholly-owned subsidiary of Emirates Islamic Bank, offers Sharī'ah-compliant, professional and technologically advanced brokerage services.[1] The coverage includes securities listed on Nasdaq Dubai and extends to *ṣukūk* trading.

In Malaysia, there is institutional support for Islamic financial planning and wealth management. A Centre for Islamic Wealth Management was established in 2013 as a joint initiative between BNP Paribas Malaysia and INCEIF – The Global University of Islamic Finance.[2] It is dedicated to supporting the growth of the global Islamic wealth-management industry with the key objectives of furthering education, industry innovation and policy development. The Securities Commission of Malaysia published an Islamic fund and wealth-management blueprint in 2017 which focuses on sustainable and responsible development.[3] A training institute for Islamic financial planning was set up in 2001, the first in the world with this specific mandate.[4] These initiatives have resulted in Kuala Lumpur being the leading centre for Islamic financial planning and wealth management, with the issues of the impact of changing financial technology being actively addressed.

The application of new financial technology has opened up alternative Islamic funding channels to Islamic banks and Sharī'ah-compliant investment funds. An example of new initiatives has been the establishment of web-based Islamic crowdfunding platforms. These can provide both Islamic debt and equity financing at lower cost than established Islamic banks or investment companies, as, being virtual entities, they do not require expensive premises or many staff. Crowdfunding is viewed as contributing to Islamic social finance (Ng et al. 2015), entrepreneurial development in Muslim countries (Marzban et al. 2014) and social impact finance (Taha and Macias 2014). The growing list of Islamic crowdfund providers include: Ethis Crowd, a community of more than 25000 investors from around the world;[5] Kapital Boost, Asia's first Islamic P2P platform for SMEs;[6] and LaunchGood, which provides advice on crowdfunding for charitable purposes.[7] These organisations all maintain highly professional and attractively produced websites but provide very limited financial information. Some promise tempting returns but whether they will fulfil client expectations remains to be seen. One characteristic is the blurring of the distinction between commercial finance and Islamic charitable donation. Potential clients should be wary of the lack of regulation and the complications of cross-border litigation if disputes arise. Above all is the question of how safe the investment is.

Conclusion

Although there is increasing interest in the impact of new technology on Islamic finance, the field is relatively new, and there is considerable scope for empirical investigation. This chapter has identified some of the issues which could be further explored, notably process and product innovation and the new Islamic funding possibilities opening up with advances in data management. The impact on the quantity and quality of employment is concerning, with not all of the effects being positive, even if technological advance is inevitable and critics do not want to be viewed as Luddites. The effect on client experience certainly merits further investigation, notably how it may benefit the technologically savvy, but potentially be detrimental to others as finance becomes depersonalised. There is the danger of technological advance resulting in financial exclusion, rather than being more inclusive, as advocates of Islamic finance would wish.

Notes

1 www.eifb.ae/eifb-en/
2 www.inceif.org/the-centre-for-islamic-wealth-management/overview/
3 www.sc.com.my/wp-content/uploads/eng/html/icm/ifwm_blueprint_170112.pdf
4 www.ibfim.com/
5 www.ethiscrowd.com/
6 https://kapitalboost.com/
7 www.launchgood.com/#/

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4

FINTECH IN ISLAMIC FINANCE

From collaborative finance to community-based finance

Celia de Anca

Introduction

Collaboration is the watchword of our times: co-creation, co-sharing, co-working, co-design, co-thinking and particularly co-finance. Working with others is a key element in the new forms of economic activity. Is this the result of new technological developments or collaborative communities that have used new technologies to adapt to the emerging collective paradigm? Either way, the techno-collaborative economy has arrived, and all the signs suggest it will be with us for many years to come.

Finance has been particularly affected by this new techno-collaborative economy. Automated complex reasoning, big data, blockchain and other technologies included under the generic heading of fintech are transforming the world of finance in unprecedented ways. Fintech is not only transforming the way we make financial transactions, but also the way we connect, creating a global ecosystem of capital holders and capital seekers that connect outside the mainstream financial intermediation institutions, and that is often referred to as the democratisation of investment.

How well-placed is Islamic finance in this emerging environment? In many ways, collaborative finance has always been at the core of Islamic finance principles. That said, Islamic finance has very precise rules and a legal monitoring process that these agile communities lack and are unlikely to adopt.

This chapter analyses three fundamental aspects of fintech solutions in Islamic finance: first, the new collaborative economy and the sociological elements behind this new form of collective economic relationships. Second, collaborative fintech and new forms of technology-driven financial intermediation solutions being launched in the market between capital holders and capital seekers. Finally, the chapter explores the opportunities and challenges for Islamic finance.

Could the industry become agile and flexible, as new financial forms require, or will its slower procedures and standards compliance requirements hamper creativity? Could new thinkers in Islamic finance create guidelines for fintech? Could the new generation of entrepreneurs in the Muslim world team up with the established industry to create a new Sharī'ah-compliant fintech ecosystem? And importantly, could new technologies help place finance at the service of the community, as is inherent within Islamic finance principles?

Community at the heart of the collaborative economy: The story of Ahmed Barrad

Ahmed lives in south Spain. "He is Muslim, Granadino, Engineer, Ecologist, and Real Madrid Fan." These are the very words he uses when asked about his identity, by order of priority, he normally adds. Muslim and born in Granada by birth; a Real Madrid fan; and an engineer by choice. Proud of all his identities, and living them to the full, when he thinks about what he wants to do in the future, particularly in terms of his career, he believes he can make an important contribution to the environmental community. He and his friends are developing ideas in the agribusiness sector he believes can improve greatly the lives of the people in the communities he shares, while allowing him to make a living at the same time. Work is hard to find in Spain after the 2008 global financial crisis, but he has managed to make a living from his shared communities, saying he prefers earning around €1,000 a month working on a common-good project than three times that figure working with people whose values and objectives he does not share.

Skilled in IT, he is up-to-date with the latest apps and the possibilities of the internet of things (IoT). He and a group of people with the same ideals have created a platform called *Al-Andalus Nature* that uses an app he designed to connect consumers with producers of tropical fruits, specifically mangoes, avocados, kiwis and others, organically grown on the Malaga and Granada coast as well as in northern Morocco. The platform also offers a series of mechanisms to arrange logistics, obtain licenses and to transport produce from the seller to the consumer, and from which he takes a small share.

Now Ahmed and his partners are designing an innovative payment system based on Islamic principles that will allow producers and consumers to trade without interest. Buyers commit to buying part of the production in advance, allowing producers to purchase equipment and other resources. They are also designing a cryptocurrency that can be used to pay part of the transaction, but that also will help create an internal community of goods and services among the users of the platform.

Ahmed's story is not unusual: well-educated young people all over the world have similar dreams. Some of them have ended in success stories backed by big venture capital funds; others have managed to survive without much capital but with a dedicated client base, while others have failed after a few months.

By analysing three main aspects of Ahmed's experience, we can identify the role of such stories in the emerging paradigm of collaborative initiatives within an ecosystem of technological mechanisms applied to finance, and particularly to Islamic finance. Such an analysis can shed light on new ways of doing business that are not only disruptive in terms of technology, but also in the management of new economic units, while at the same time challenging traditional approaches to doing business.

The three main elements to further explore are: a new community drive applied to a new way of doing business in the collaborative economy; new connectivity technologies that help change financial transactions; and how Islamic finance principles can adapt to these new ways of doing business. The rest of the chapter will be analysing each of these elements.

The emergence of community-based finance in the collaborative economy

The sharing economy is generally defined as "the peer-to-peer-based activity of obtaining, giving, or sharing the access to goods and services, coordinated through community-based online services" (Hamari et al., 2015, p. 1). As the definition suggests, the sharing or collaborative economy includes three different types of actors.

1. Providers who share goods or services on an occasional basis;
2. The users of these good or services; and
3. The developers of collaborative platforms that connect the two other players.

Collaborative economy transactions generally do not involve a change of ownership and can be carried out for profit or not-for-profit (COM, 2016). While initial numbers are still low, at around $14 billion, many experts estimate the potential for growth in the sharing economy as being up to $335 billion in 2025 (Yaraghi and Ravi, 2017). In the European Union alone, it is estimated that collaborative platforms generated revenues of €3.6 billion in 2015, approximately 0.2 per cent of the EU's GDP (COM, 2016).

On average, more than 85 per cent of gross revenue generated by collaborative economy platforms goes to providers. The internet has been the main driver of the collaborative economy, and particularly the use of smartphones, providing the basis for developing collaborative platforms and for linking them with service providers and purchasers. In addition to the role of the internet, other social factors such as population density have played an important role in the development of the collaborative economy, since larger populations in cities have provided the critical mass to support online shared services (Yaraghi and Ravi, 2017).

In addition to new technological solutions and population density, a sociological phenomenon that some sociologists have labelled a "new tribalism"

(Maffessoli, 1988) has emerged: a new form of being together that means sharing our emotional and productive lives. In this new paradigm, individuals seek to transcend their individualities by playing a role in open and free tribes that provide them with temporary identification. A similar concept was used by Castells (2004), called *project identities*, whereby individuals link their personal projects together with others for a common good.

These *projected identities* are one result of the emerging forms of relationships enabled by new information and communication technologies, creating network societies in the process. According to Castells, these networks allow for a new kind of social relationship characterised by collective behaviour rather than a collective sense of belonging (Castells, 2004).

It is now a question of individuals choosing identities that they consciously want to be a part of and contribute to. These digital communities are not only a way to share experiences, but a new way of projecting economic ideals with people that might be of different origin or creed, but with whom we share the same goals and values and with whom we want to build a common project. Community, then, is not an end but the means for a common project to be successful.

The fact that this new form of togetherness is a product of decision and not of necessity is what makes it so rewarding to participate in. These communities of the network society, unlike those of the 1960s, are much more about sharing ideas and projects than sharing feelings – i.e. feeling good is fine and desirable, but it is not the primary objective for joining.

The collective energy of the new paradigm – whether labelled projected identities (Castells, 2004), aspirational identities (de Anca, 2012) or liquid identities (Bauman, 2008) – represents a form of temporary engagement to a group that is bound together by a common interest and that uses the differences between its members to collaborate, co-create or execute other kinds of joint action within a collaborative economy.

Shared action is the driving force behind collaborative economics. According to Von Mises (1949), the central issue in traditional economies is action as an individualistic application of human reason to select the best means of satisfying individual ends. In a complementary way, the collaborative economy could be defined as the joint application of human reason to select the best means of satisfying the collective ends of the group. Collaborative economics is defined by two complementary factors: the collaborative nature of needs (ends) and means. To qualify as collaborative, an activity must satisfy a shared need within a group. For example, car sharing is a response to a shared need for transportation. The sharing economy implies a collective use of need-oriented means within the group to satisfy a previous need.

The collaborative economy is prominent in five key sectors: peer-to-peer accommodation; peer-to-peer transportation; online skills, comprising either on-demand household services or on-demand professional services; and collaborative finance.

Collaborative finance is a fundamental element within the collaborative economy. Collaborative finance takes advantage of the disintermediation process that began in the 1970s and that has accelerated more recently through new technological developments. Financial institutions are no longer the only intermediaries between savers and borrowers, and instead, a myriad of online platforms now channel cash into different projects, initiatives or to borrowers.

A specific form of collaborative finance is community-based finance**,** which can be defined as a form of cash flow that channels the financial resources of savers in a community into the wellbeing of that community via economic activities, which members of the community believe should be undertaken and therefore willingly support with their savings (de Anca, 2012).

Community finance not only takes advantages of the opportunities provided by new means of financial disintermediation and the channels opened by technology but represents a change in people's values: a step further in the movement that was initiated in the 1970s, linking values with finance. At that time, investors demanded greater transparency in investments, and specifically they wanted to invest in projects in line with their values. This value-based financing involved many popular initiatives, including ethical banking, microfinance, co-operative banking and Islamic finance. What all these have in common is a belief that the financial institution, regardless of its size, is there to serve the community at a local or global level.

As depicted in Figure 4.1, the binding element that creates a community can be of two kinds, either a proximity of space, as with some cooperative banking elements, or a proximity in values, that can be the binding element of financial transactions, including ethical or Islamic finance, or some crowdfunding operations. The feeling of proximity drives savers and borrowers to work for the community to produce the goods and services they believe will help their community to advance.

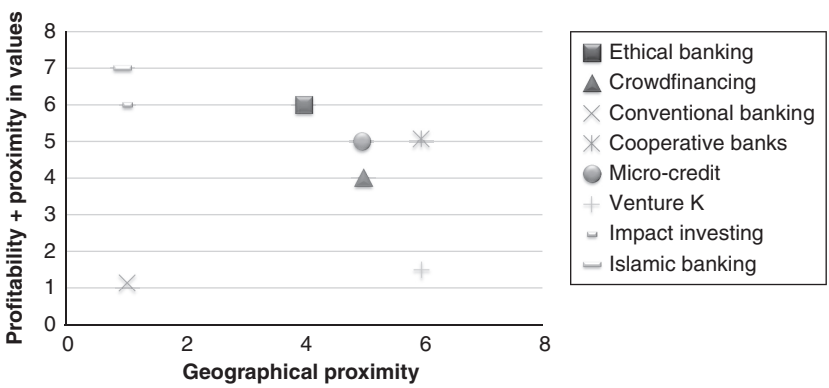

FIGURE 4.1 Community banking.

Disruptive technologies in the era of hyper-connectivity

In a recent financial report by De la Torre and Torralba (2017), a number of reputed financiers identified five main technologies as the basis for technological disruption; among them are artificial intelligence (AI) and its robotic implications, the internet of things (IoT), autonomous vehicles, Blockchain and 3D and 4D printing. These five technologies will disrupt the future of key sectors of the economy and are driving the venture-capital revolution. Especially relevant for the financial industry are AI, blockchain and the IoT, the basic technologies that make up fintech. "Fin Tech usually refers to the segment of the technology start-up scene that is disrupting sectors as such as mobile payments, money transfers, loans, fundraising and asset management" (De la Torre and Torralba, 2017, p. 3).

Artificial intelligence (AI) enables computers to replicate tasks or responses traditionally considered the domain of humans. When applied to replicating human thinking and supplied with enough data, general AI can perform accurate financial predictive analytics. When the purpose is applied to automating various daily tasks to improve efficiency, the process is called narrow AI (De la Torre and Torralba, 2017, p. 11).

The key to the internet of things is the smartphone, now used by more than half of the people on the planet. Using smartphones, transmitters can be located in large interconnected networks where data can be shared, analysed and managed (De la Torre and Torralba, 2017, p. 13).

Blockchain is essentially a transaction log. With this new technology based on decentralised and encrypted information, it is possible to manage records of transactions in a decentralised and comprehensive manner, creating trust between all parties, since any information can be verified (De la Torre and Torralba, 2017). Blockchain became popular with cryptocurrencies, in particular bitcoin,

> however, the capacity to be able to record any transaction in a secure way, eliminating intermediaries, will soon make it possible to carry out international payments at zero cost, and can thus be used to simplify the process of buying shares, contract enforcement, smart contracts facilitate tax connection etc.
>
> *(De la Torre and Torralba, 2017, p. 19)*

The revolution initiated by these three technologies is transforming the way we make payment exchanges and especially the relationship between capital holders and capital seekers, whether through the intermediation of financial institutions or without them. This revolution has produced an emerging ecosystem of start-ups finding solutions to connect savers and borrowers directly, while the traditional financial industry has also responded with its own innovations.

Fintech and the democratisation of finance in the collaborative economy

The trend towards financial disintermediation reflects the desire for stronger links between the real economy and the financial sector that emerged in the wake of the 2008 financial crisis, partly caused by the overabundance of derivatives and complex synthetic products. The resulting mistrust towards banks has sparked a growing movement of young people all over the world investing or borrowing without intermediaries. These new ventures, which in the opinion of some experts could create a $90 billion investment market by 2020 (Barnes 2016), take advantage of technological innovation and, most of all, of the global use of the internet and smartphones.

By connecting through digital platforms, savers and borrowers have driven a return to the real economy, and, more importantly, these alternative financing methods claim to be transparent, giving both savers and borrowers more direct control over their finances.

The terms collaborative finance, internet finance or generic alternative finance, as outlined by Milne and Parboteeah (2016), encompasses a number of business models, such as:

- *Peer-to-peer finance*, also called marketplace lending, which consists of online platforms such as Prosper or Zopa, that directly connect savers and borrowers.
- *Crowdfunding* refers to platforms such as Crowdclub or Angellist, where money is raised for specific projects by a number of smaller individual contributions.
- *Foreign-exchange services* include platforms like CurrencyFair or CurrencyCloud, where international traders can directly find their currency needs.
- FirstCircle or Kabbage are platforms to provide cash to *small businesses*.
- Platforms, such as MarketInvoice, which specialises in *invoice discounting*, offer small firms ways to improve their cash flow by securing advances from investors against due invoices.
- Finally, one of the most popular innovations has been *cryptocurrencies* like bitcoin or litecoin, which use blockchain technologies to create digital money without a central issuer, allowing instant, online payments.

The first fintech start-ups were peer-to-peer (P2P). P2P began with the establishment of UK-based company Zopa in 2005 and the US-based Prosper in 2006. Both facilitated lending directly from savers to borrowers without the use of banks. P2P still represents less than 1 per cent of total banking lending. However, in some countries such the UK, P2P lending has become an important source of loans for smaller companies, amounting to 13 per cent of new conventional bank loans to firms with turnovers of less than £1 million to £2 million per year (Bajpai, 2016).

Crowdfunding followed P2P. It generally refers to an open call to the public to raise funds for a specific project, which can be for profit or non-profit. Funding can come in different ways: non-returnable cash donations, sponsoring through crowd financing, when donors receive something in return for donations in a non-cash form. Crowdfunding can also come in the form of profit-sharing schemes. Finally, there are crowdfunding lending companies, whereby savers lend cash, with or without interest (COM, 2014).

Among the users of crowdfunding are SMEs, start-ups, micro-entrepreneurs, social entrepreneurs, the self-employed, the cultural and creative sectors, public authorities, innovative or environmental projects, public interest bodies, researchers, consumers or the unemployed COM, 2014).

The financial industry's response to fintech

A 2017 PwC global survey of 1,308 financial services and fintech executives on the transactions customers were conducting via fintech companies showed that among the activities executives perceived most likely to be lost to these new online ventures, were, in order of priority: payments, fund transfers, personal finances, personal loans, traditional deposits and insurance and wealth management (PwC, 2017).

Although the fintech movement has been driven by independent start-ups, looking to new spaces for disintermediation and capturing some businesses away from the banks, the traditional financial industry has begun fighting back. A business that began with a network of small ventures is increasingly turning into a broader ecosystem of different businesses, new start-ups, plus traditional financial institutions looking in many cases for partnerships (PwC, 2017). Both parties are benefitting from the new partnership schemes: traditional financial institutions by partnering with innovators in outsourcing part of their R&D and bringing solutions to market quickly, while fintech companies also benefit from these partnerships, as they need both financing to try out new models as well as a large customer base to try out their new mechanisms. New partnering schemes are producing a change from business-to-consumer (B2C) to business-to-business (B2B) business models, for example robo-adviser products are now starting to be used by financial institutions to cater to their installed client base (PwC, 2017).

Is the Islamic finance industry ready for fintech?

The Islamic financial industry is young, highly technological and with the excess liquidity required to finance innovation. Moreover, the global network of young Muslims, experienced and educated in finance, new technology and big data, is eager to contribute to new ventures based on Islamic principles. It is hardly surprising that the Sharī'ah-compliant fintech industry is growing more quickly than its conventional equivalents. In this context, there are three areas worth

exploring: new independent ventures created in the Sharī'ah-compliant fintech ecosystem; the response by Islamic financial institutions; and institutional support to promote fintech innovation in leading Muslim countries.

In the emerging fintech landscape in Islamic finance, the IFN Fintech platform, supported by the REDmoney group, a financial-based media company with a specific focus on the global Islamic finance industry, has been tracking the landscape of new fintech ventures with either Sharī'ah-certified products, or that are in the process of securing a Fatwa (IFNFintech, 2017a). In its December 2017 report, IFNFintech identified 116 Fintech companies in 24 countries, particularly in Malaysia, the UAE and Indonesia. Nine business models were identified: crowdfunding platforms (37); banking software (20); payments (16); peer-to-peer finance (12); personal finance trading and investment (15); blockchain and crypto currencies (6); digital banking (6); insurance (2); data and analytics (2) (IFNFintech, 2017b).

The development of financial business models by the new fintech ventures have followed a similar path to their conventional equivalents: the most-developed sector has been crowdfunding and personal finance and investment, followed by payments remittance and forex. There have also been some key initiatives in the creation of gold-based cryptocurrencies, in which Islamic financing is moving at an even faster speed than conventional equivalents. In the next section are a few brief examples from each category.

Crowdfunding

Beehive P2P, based in Dubai, is the UAE's first online peer-to-peer finance platform that facilitates Sharī'ah-compliant financing solutions for SMEs. The company is regulated by the Dubai Financial Services Authority (DFSA) and has certified that its business is Sharī'ah-compliant by engaging with Bahrain's Sharī'ah Review Bureau (SRB) to undertake the Sharī'ah supervisory board's certification and Sharī'ah audit functions for its Islamic operations. Beehive has raised funds to a total value $10.5 million by 2017 (Beehive, 2017; IFNFintech, 2017c). Similarly, Yielders is the UK's first Sharī'ah-compliant fintech company, and one out of five real-estate crowd funders to be directly regulated by the Financial Conduct Authority (FCA) (Yielders, 2017; IFNFintech, 2017d).

Payments remittance and forex

OneGramCoin (OGC) is the first Sharī'ah-compliant certified cryptocurrency. Based in Dubai, OneGram uses blockchain technology to create a new kind of cryptocurrency linked to gold. It launched an Initial Coin Offering (ICO) in May 2017, obtaining over $40 million. The currency has been a success, and at the time of the closing of the ICO on 4 September was valued at $50 and was trading at about $355 in December 2017 (OneGramCoin, 2017; IFNFintech, 2017b).

Similarly, NOWMoney was the first fintech in the Gulf region to use mobile banking technology to provide financial services to low-income migrant workers, who used it to send home remittances (Now Money, 2017; IFNFintech, 2017c).

Trading investment and personal finance

The Farringdon Group was established in 2007 in Malaysia. The company offers wealth management to individuals across the Asia Pacific region, Russia and Central Asia. The company is pioneering the creation of a robo-adviser, using artificial intelligence (AI) to predict financial analytics based on raw data (Farringdon, 2017).

Arabesque is a London-based asset management company founded in 2013. It is one of the first Sharī'ah-compliant companies to screen environmental, social and governance (ESG) parameters and does so by leveraging on machine learning and big data. The firm has officially rolled out the Arabesque S-Ray, a new diagnostic tool which processes ESG data-points to monitor the sustainability of over 4,000 of the world's largest corporations. The technology integrates over 200 ESG metrics with news signals from an excess of 50,000 sources across 15 languages (IFNFintech, 2017e; Arabesque, 2017).

The Islamic finance industry's response

The Islamic finance industry has reacted more quickly than its conventional counterparts, in two fundamental areas; developing innovation in its own capacity and partnering with new Sharī'ah-compliant fintech ventures. Islamic banks are exploring the possibilities of new technologies, particularly AI and blockchain, to provide the latest and most efficient products to their clients. One example is BIMB Invest, a wholly-owned subsidiary of Bank Islam Malaysia Berhad, which has recently started to incorporate AI and big-data analytics into its strategy to eliminate any biases and intuition in the decision-making process (BIMB Invest, 2017; IFNFintech, 2017b).

Saudi Arabia's Al Rajhi Bank, which holds the largest pool of Islamic banking assets globally, recently concluded a cross-border money transfer using Ripple blockchain technology. Having completed its first blockchain cross-border deal, the bank is now looking to use blockchain to serve its retail and corporate customers and is exploring how to integrate blockchain technology to provide remittance solutions to its clients. Saudi Arabia is one of the leading countries for remittances and Al Rajhi has the largest remittance centre network in the country (over 200) (IFNFintech, 2017b; Al Rajhi Bank, 2017).

Bank Muscat's Meethaq, a pioneer in providing Islamic solutions in Oman, has recently launched a digital SME platform combining digital technology and its SME expertise to support the development of small and medium businesses at every stage of the business lifecycle. Meethaq's Accelerate SME portal also serves as a marketplace for discounted business services tailored for SMEs, allowing

start-ups, entrepreneurs and business owners free access to business resources, services and funding solutions (Meethaq, 2017; IFNFintech, 2017b).

Like their conventional counterparts, Islamic banks have been very active in partnering with innovative start-ups. An interesting example is Bahrain Islamic Bank's (BisB) partnership with Flat 6 Labs Bahrain – a start-up accelerator programme under the Cairo-based Flat 6 Labs umbrella. Flat 6 Labs has launched over 75 companies backed by more than 300 entrepreneurs (BisB, 2017; IFNFinTech, 2017b).

One of the most remarkable aspects of the Sharī'ah-compliant fintech industry is the development of public-partner institutions to create ecosystems for new start-ups. For example, in Bahrain, the UAE or Saudi Arabia, there is intense cooperation between public centres to foster entrepreneurship between private banks and young entrepreneurs. One of the most active such institutions in recent years has been the Dubai International Financial Centre (DIFC), which has an agreement with the Dubai Islamic Economic Development Centre (DIEDC) for the purposes of establishing Sharī'ah-compliant financial technology start-ups. The agreement will involve public centres, young entrepreneurs and also established Islamic financial institutions such as Emirates Islamic, Dubai Islamic Bank and Abu Dhabi Islamic Bank, that will be integrating the platform as mentors to innovators in the field of Sharī'ah-compliant fintech (IFNFintech, 2017e).

Fintech from a Sharī'ah perspective

To understand any possible Sharī'ah issues, it is important to analyse the different components of fintech. Table 4.1 presents the different components of fintech in Islamic finance.

Fintech is revolutionising the financial world through automated complex reasoning mechanisms and new technologies able to make more efficient decision-making procedures. These new technologies are resulting in the creation

TABLE 4.1 Components of fintech in Islamic finance

	Existing Islamic finance industry	*Emerging initiatives outside financial intermediation organisations*
Capital holders	New banking products partnering with collaborative start-ups (crowdfunding, peer-to-peer)	Crowdfunding, peer-to-peer
Capital seekers	New banking products partnering with collaborative start-ups (crowdfunding, peer-to-peer)	Crowdfunding, peer-to-peer
Payments methods	Blockchain-based technologies (cryptocurrencies, etc).	E-commerce, blockchain-based technologies, etc.

of new products and in parallel a series of ethical demands by scholars to guide both the industry and potential consumers. Some experts say fintech financing is inherently Islamic, as it connects owners (*rabb al-mal*) and users of capital directly. Moreover, Islamic finance is concerned with the wellbeing of the community and the transparency of the transaction. As a result, Islamic scholars do not oppose fintech generally.

We can further analyse the three main types of operations from a Sharī'ah perspective:

1. *Payment exchange*: are blockchain technologies changing our traditional ideas of currency, or are they changing the way transactions are made?
   Blockchain will affect traditional uses of money:
   a. *Medium of exchange*. We are moving towards a cashless, moneyless society. As long as these methods are clearly understood, transparent and fair, they should not pose any concerns to Sharī'ah.
   b. *Store of value*. In principle, new technologies should not modify the store of value, unless cryptocurrencies such as bitcoin become new forms of wealth storage. If they do, Sharī'ah will have to make its own recommendations, since what is stored is not based on any real wealth.
   c. *Unit of account*. Will bitcoin initiatives affect how we value products and services? Is Sharī'ah concerned with the mechanisms by which products and services are valued?

   Since technology will always be ahead of the experts, Sharī'ah scholars could develop guidelines for any of the three uses of money, rather than waiting to react to any new product.
2. *Capital holders and capital seekers*: Fintech can provide solutions for the supply and demand side of financial products in a scenario with fewer intermediary institutions and where there are direct relationships between owners and users of capital. The most developed areas include:
   a. Online crowdfunding platforms that connect companies and investors that want to contribute to the funding of small businesses or start-ups by providing some form of equity capital. Social media can be used to raise financial resources from large networks of people to support initiatives. Investors can receive in return either the capital invested (in form of *qard hasan* or benevolent loan), return the capital with a mark-up (*murābahah*), receive in exchange a product (as a way to advance sales, which is equivalent to *salam* or *istisna'*) or they can be a form of non-cash related compensation, (e.g. a small role in a movie, tickets to the performance of the movie produced, a book signed by the author, along the lines of a gift or *hibah* given in a safe-custody contractual arrangement (*wadiah*).
   b. Peer-to-peer lending. Whether outside the banks or as a new investment vehicle for them, P2P platforms finance real products and services. Payments can be made on a *murābahah* basis, so in principle it

would also be acceptable from a Sharī'ah point of view. The question is whether the industry can lead the way by creating Sharī'ah-compliant P2P platforms on a *mudārabah* basis, for example. This will open the way to other emerging initiatives.

Fiqh have sometimes been accused of being too reactive. In this emerging scenario, Sharī'ah scholars need to take a more proactive approach rather than simply reacting to the three main components: new methodologies for exchange of payments, new channels for capital holders and new resources for capital seekers. Investments, loans and payment systems can be created to allow new initiatives to emerge by outlining Sharī'ah principles in terms of remuneration of the capital supply, non-interest-based relationship, eliminating uncertainty and transparency of contracts.

Conclusion

In concluding this chapter, it is important to answer the question whether fintech solutions in Islamic finance provide an opportunity to move from collaborative finance to community finance. In a talk about the 2008 crisis, the Islamic economist Umar Chapra argued that financial systems should take the savings of the few to meet the needs of the many, but that somehow the system has been reversed in recent decades, and now the financial system channels the savings of billions of people to the businesses of the few.

Chapra and other Islamic economists saw the 2008 crisis as an opportunity to reverse some of the wrongdoings of the conventional financial system. For many, Islamic financial principles based on non-speculation, non-interest, and using the financial system to help the community rather than for individual gain, could offer an alternative to the conventional system, in which financial solutions could help both the individual and the community.

From a public interest principle, the question is: can Islamic finance, supported by new technologies, finance the needs of the many? According to a World Bank Report on developmental financial needs (World Bank, 2012), global financial needs are huge:

- 2.5 billion people, or 70 per cent of the adult population in developing markets, still have no access to basic financial services and are predominantly from Islamic countries.
- Of the estimated 365 million to 445 million formal and informal micro, small and medium enterprises (MSMEs) in the developing world, approximately 70 per cent do not use external financing from financial institutions, while another 15 per cent are underfinanced.
- The unmet need for credit by formal or informal MSMEs in emerging markets is in the range of $2.1 trillion to $2.5 trillion. In the Middle East that figure is between $165 billion to $200 billion.

Islamic finance, based on the principle of public interest, raises the following three questions: How can technological financial innovation based on Sharī'ah principles help meet the economic and financial demands of the community? What instruments of the new fintech scenario should it be focusing on? What are the limits of Sharī'ah for financial innovation?

Fintech is a revolution born out technology and at the same time is a community revolution. New collaborative scenarios have made blockchain technologies and crowdfunding platforms possible. Young people around the world have reacted to the 2008 financial crisis by demanding new approaches to finance whereby individual greed will be replaced by community finance. Alternative financing initiatives have been particularly popular among young people, since not only has the crisis within the financial system cut lending opportunities for their projects, but also because they will continue to bear the excess leverage that has led to the present situation. Within a few years, what started out as a community demand to democratise finance has created a few players who have managed to capitalise on most of the benefits through a few corporate initiatives. What started out as a community-based economy has quickly turned into a collaborative-based economy that risks mirroring the conventional financial system that led us into the current crisis.

Community-based finance, as Umar Chapra argues, should be about channelling billions of people's savings into the needs of the many, but collaborative finance could quickly turn into a few gaining from the savings of the many. Hopes that the collaborative economy would create more jobs and serve the needs of the many have turned into an unstable and precarious job market. At the same time, consumers throughout the world have seen their rights diminished by an industry that seems to resist regulation. Only a handful of new companies, such as Uber or Airbnb, have been able to benefit from the new paradigm, while the majority can only watch as this new wave of opportunities passes by without benefitting them.

Sharī'ah-compliant fintech has proved to be an industry that is as technological as it is dynamic and as innovative as its parallel counterpart. However, fintech, based on Islamic principles, can still offer something the conventional banking system lacks: a well-defined, cohesive community which holds, at its core, a value system with established rules and definitions of how to operate, as well as what type of business should be financed for the wellbeing of all types of communities.

In that regard, there are encouraging signs of a number of fintech ventures whose aim is to find solutions for the underserved, such as the creation in 2016 of the Islamic Fintech Alliance, where eight crowdfunding platforms with social aims joined together to help the sharing economy for Muslims, as well as to serve the global community by providing universally attractive ethical financial solutions (Islamic Fintech Industry Snapshot Report, 2016).

Other encouraging initiatives aimed at social improvement include Finocracy, which describes itself as "the world's first *zakat*-driven, humanitarian crowdfunding

platform". On its website, Human Crescent says it aims to channel *zakat* donations to impactful projects that it divides into the following categories: human trafficking victims, refugees/internally displaced persons, microfinance, education, disaster victims and poverty alleviation (Bensar and Rodriguez, 2018; Finocracy, 2017).

Fintech offers a way whereby new technologies can help channel Islamic principles to create a new generation of financial products that can satisfy the demands of future generations. The advantage of this approach is that if the community feels an organisation is straying from those basic principles, it will immediately stop using its services and destroy the reputation of the provider of such services in the process. Thus, change does not come from the industry itself, but from conscious communities that demand financial services operate within a system of rules with one crucial premise: to help individuals in the community develop economic ventures for the betterment of the community itself.

The principle of public interest can be the basis for new fintech alternatives, while Sharī'ah academics need to help with the creation of new products, defining clearly what complies with Sharī'ah principles and what departs from those principles, in a proactive rather than a reactive way.

In following the principles of *maslahah* or public interest, scholars should be asking: Is fintech closer to the real economy? Is it free from financial speculation? Can it help alleviate poverty? Can it help improve financial inclusion? Can it help resolve social problems or help protect the environment and improve food and water security?

In a rapidly changing scenario with greater diversity, Islamic financial experts cannot afford to wait for new products to emerge and then form an opinion. Instead, a proactive methodology of defining principles and guidance for capital holders, capital seekers and transactions offers a more realistic approach to managing the emerging fintech industry.

Young people like Ahmed dream of a place within a community where they can contribute to its wellbeing. We can change the fintech industry's current paradigm of winner takes all to a win-win approach by applying new technologies based on Islamic finance principles, creating jobs in communities while creating products and services to improve people's lives. If the principles of Islamic finance are not applied soon, restricted access to liquidity for the majority, along with overly complex regulations, risk creating yet another self-serving industry controlled by a tiny minority.

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5

FINANCIAL INTERMEDIATION, FINTECH AND SHARĪ'AH COMPLIANCE

Shariq Nisar and Umar Farooq

Introduction

Financial sectors thrive on trust. When the modern financial system started taking shape in the era of industrialisation, the most important challenge was how to mitigate the problem of moral hazard and adverse selection. Slowly, financial institutions were developed around a key financial regulator (mostly a central bank) and it came to be a common understanding that financial institutions (especially banks) should be deliberately cut off from the real economy. It was also thought prudent to keep the risk of a financial burden on the shareholders and promoters of financial institutions, and general savers and the public at large should be protected. Deposit insurance was also introduced to provide a further cushion and increased trust of the general public. Interest (reward for saving) was first introduced on the liability side and then to the asset side to keep the financial system aloof from the real economic burdens. Financial sector regulators also extended some other favours, like interest being treated as tax deductible, which ensured regular and continuous business for the financial institutions.

Further, specialisation segregated the entire financial system into three different segmentations, namely, the banking sector (including financial institutions), the capital market and the insurance sector. In some jurisdictions, all three eventually came to be regulated by a distinct set of regulators. Of late, there have been attempts made to bring entire financial regulations under one umbrella. There is a move from entity-based regulations to principle and activity-based regulations in order to achieve greater financial cohesion and stability. In spite of all precautions, the global financial system has been under regular stress and hardly any major economy is left without a serious bout of the economic crisis in the last two decades. It is realised that a system that was originally designed to avoid moral hazard issue no longer does so and it has developed its own moral

hazard challenges from within. The institutional build-up not only led to very skewed and lopsided wealth concentration but also excluded a great majority of people outside the reach of the financial system. The credit model practised by most financial institutions made the most important economic institutions like small and medium-sized enterprises (SMEs) and micro, small and medium enterprises (MSMEs) ineligible from the fruit of financial mobilisation.

Ethical finance, Islamic finance, green finance and microfinance all emerged from different backgrounds but, eventually, have become a sort of alternative to the problems observed in the mainstream financial system. Islamic finance is special among all of them as it started on the basis of religious sanctity rather than socioeconomic factors. Islamic economists (and the Islamic scholars writing on economic issues) who started deliberating on the current economic system since the early 1920s first argued against the system of "interest" as practised by the banking system and then they also pointed to loopholes in the risk-mitigation techniques as practised by the commercial insurance model. The independence of many Muslim countries and the oil boom of the 1970s added immense power to the demand of the religiously acceptable financial system. This began with the emergence of Islamic banks and then Islamic insurance companies in different countries. However, the ecosystem and financial regulatory architecture remained the same, including the incentives, which did not change much, and therefore the progress of Islamic finance veered towards products and services that thrive in the conventional financial ecosystem.

Consequently, the Islamic financial institutions that we see today remain elitist and, in spirit, follow the principle of segregation from the real economy. Over the years, Islamic finance has come to be known more as a conscience keeper rather than a real economic movement focusing on distancing itself from *ribā* (interest), supporting the real economy and spreading economic fruits to a wider section of the society.

The emergence of fintech is the biggest disruptor the financial sector across the globe has ever seen. This is also watched from the point of view of Sharī'ah compliance. This chapter examines how fintech-led financial intermediation would help to solve some key Sharī'ah issues faced by traditional financial intermediation led by banks. Financial intermediation based only on interest-rate mechanisms has obvious limitations as it hampers both investments and employment. The chapter concludes that fintech-led financial intermediation would lead to better Sharī'ah compliance and address the issue of financial inclusion as well as better financing of SMEs who have hitherto been unable to access mainstream financial market.

The biggest Sharī'ah-compliance issue with the banking system is it deals with interest which is prohibited. The major reason why banks began to deal only with interest is the agency problem or moral hazard and information asymmetry. Fintech is resolving both these issues of moral hazard and information asymmetry. Fudging of account is becoming difficult with the adoption of blockchain technology. Digitisation of entire business transactions is also making

it difficult for business owners to under-report their profits or embellish their losses. Information available through credit bureaus is also adding to a more robust customer profiling.

Second, another major issue observed with the banking sector is its inability to operate below the certain minimum threshold, which in turn has led to a large number of the poor being excluded from the financial system. The emergence of fintech has helped in reducing the information asymmetry which helps in better credit evaluation and risk management. As a result of this, the cost of funds comes down for banks and financial institutions which are able to then pass on the advantage to their customers, thus opening the doors to organisations and individuals who were hitherto excluded, bringing more people into the formal financial system and granting them access to credit to undertake economic activities. Previously, a lot of people could not borrow from the financial system owing to a lack of credit history and relevant financial data. That trend is changing now.

The third major problem that fintech is helping to resolve in the banking sector is the bank's ability to finance on the basis of risk sharing. Because of agency problems banks are forced to adopt collateral-based lending which actually results in finance flowing only to relatively richer sections of the society. This accentuates wealth concentrations in the hands of the upper echelons of society. Entrepreneurs with brighter ideas and SMEs do not get finance for lack of collateral. This hampers wider investments and employment opportunities across sections of society.

Financial intermediation and economic growth

An efficient financial intermediary will mobilise funds from savers to those seeking these funds for more productive use at an affordable cost to help propel the growth and development of the economy. Studies over the years have empirically shown that there exists a correlation between financial systems and economic development. Gurley and Shaw (1955) stated that developed countries tend to have highly organised and broad financial systems to facilitate the flow of funds between borrowers and lenders, whereas, in developing countries, the financial system is much less developed. This fact is further substantiated by Levine (2003) that countries with better developed financial systems tend to grow faster. Further, a better-functioning financial system eases the external financing constraints that would have impeded firm and industrial expansion. Supporting the argument, Nobel Prize winner Merton Miller (1998) argued that financial markets' contribution to economic growth is a proposition that is too obvious for serious discussion.

Other key aspects of a sound financial system are its ability to diversify risk and maintain healthy liquidity. Certain high-return investment projects may have a long gestation period which may discourage people from investing for want of liquidity. Diamond and Dybvig (1983) through their model depict how,

in the absence of an intermediary, all investors are locked into illiquid long-term investments that may yield high payoffs only to those who consume at the end of the investment. Financial intermediaries mobilise savings by aggregating and pooling funds from multiple sources and creating small denomination instruments. According to Levine (1997), these instruments present an opportunity to individuals and households to invest in a diversified portfolio. Without such instruments they will have to buy and sell entire firms.

The theories of the economic role of financial intermediaries built on the economics of imperfect information began to emerge in the early 1970s through the seminal contributions of Akerlof (1970) and Spence (1973). Financial intermediaries exist because they can reduce information and transaction costs arising due to information asymmetry between borrowers and lenders. The evolution of information technology has led to the development of electronic marketplaces which are helping in deepening the extent and reach of financial intermediaries to a newer set of people which were earlier either completely ignored or the cost of intermediation was too high. According to the Australian Government (2016), financial technology is reducing information asymmetry in the marketplace and thereby helping to mitigate risk and promote the efficient allocation of scarce resources. Fintech is all about stimulating technological innovation so that financial markets and systems can become more efficient and consumer-focused. Fintech-led newer marketplaces, like crowdfunding platforms, have enabled an opportunity and an access to capital to businesses/projects, especially the SMEs which would have been unable to do so in the traditional banking, are driven financial intermediation. According to Koenitzer and Bruno (2016), Fintech's innovation means ways to originate, assess credit risk and help raise capital have provided alternative ways for SMEs to secure funding for their growth.

Fintech and financial intermediation

The innovative disruptive models introduced by Fintech have brought about a paradigm shift in the landscape of the way financial services are offered and consumed. This has brought a new vigour and energy into the financial services space. The rapid advancements in technology are being embraced with open arms. Table 5.1 presents a broad classification of fintech into different categories depending on the services offered or industry segment.

Payments, clearing and settlement

According to Boston Consulting Group Study (BCG, 2017), approximately $100 billion hasbeen invested in fintech with some significant investments attracted by fintech solutions operating in the payments space. Nearly 30 per cent of all the investments in fintech has been in this space, as this segment has the potential of touching the lives of people directly and making financial services available to all and sundry. Innovations in this domain have helped in substantially reducing

TABLE 5.1 Fintech scope in the financial sector

Area	*Products*
Payments, clearing and settlement	• Payment processing • Card developers • Subscriptions billing software
Insurance	• Companies selling insurance digitally • Data analytics • Software for reinsurance
Capital market	• Sales, trading, analysis and infrastructure tools for financial institutions
Wealth management	• Investment and wealth management platform and analytics tools
Money transfer and remittance	• International money transfer and tracking software
Mortgage and real estate	• Mortgage lending, digitisation and financing platform
Personal finance	• Tools to manage bills and track personal and credit accounts
Alternative lending	• Marketplace lending and alternative underwriting platforms
Blockchain	• Companies leveraging blockchain technology for financial solutions
Regtech	• Audit, risk and regulatory compliance software

the cost and improving the efficiency and speed of transactions. Billions of dollars are remitted annually within and outside a country and the sheer volume of transactions makes this an important segment of finance. The ever-increasing penetration of mobile phones in both developed and developing/underdeveloped countries has made it possible to increase the reach of financial services and accommodate people who were hitherto excluded from the formal financial system.

For instance, in India, the banking regulator Reserve Bank of India has issued licences to set up Payments Banks who, unlike a full-service bank, will only offer payments and savings services but cannot lend money. Of the 11 entities who were granted payments licences, 3 entities, or their group holding company, are also in the business of offering mobile services along with the Department of Posts which has an extensive rural connection, which will help in reducing the extent of financial exclusion. This shows the thrust governments and financial regulators alike are giving to the mobile payments ecosystem to further the cause of financial inclusion.

Reducing/eliminating financial exclusion

The biggest challenge countries have faced over the years is in providing access to financial services to every citizen of their country. But the efforts till now

have not yielded the desired results. There are still around 1.7 billion people who do not have a formal bank account (World Bank Group, 2018). Countries continue to grapple with financial exclusion. The reasons for exclusion range from reach/availability of financial services to the cost of offering these services to financial literacy, among others. According to World Bank's Global Findex 2017, the latest available report on financial inclusion, 69 per cent of the world's adult population had an account (bank and/or mobile) in 2017 as compared to 62 per cent in 2014, adding nearly 300 million during these 3 years.

But with increasing mobile penetration and affordability, this is likely to change faster than previously anticipated. Fintech is leveraging the mobile connectivity for offering services like payments, savings, etc. M-Pesa, a mobile money service offered by Safaricom in Kenya has been a revolution in the Kenyan economy. There were 18 million active users of M-Pesa in Kenya as of March 2017, the equivalent of two-thirds of the adult population of the country (Monks, 2017). Around 25 per cent of Kenyan Gross National Product flows through M-Pesa (The Economist, 2015). In fact, it is the developing or underdeveloped countries which are quick adopters of mobile money to overcome the challenges of financial exclusion. This is unlike the Business Correspondent (BC) model which banks used to further the cause of financial inclusion but failed to elicit the same response which the agent network of mobile-money service providers is receiving.

In India, the National Payments Corporation of India (NPCI), an institution set up by Reserve Bank of India has created platforms like Unified Payments Interface (UPI) and Bharat Interface for Money (BHIM) which can be used by institutions wanting to offer payments services. These payments services can be used even on a basic-featured phone linked to any bank. There is no requirement for a smartphone with an internet connection, which is revolutionising the payments space in the country.

New data points: Credit evaluation techniques

The increasing usage of mobile phones in both developed and developing countries owing to affordable mobile internet and smartphone handsets has enabled fintech to gather new data points based on the usage-pattern of people, which were previously unavailable. Analysing this rich data has helped fintech to bring numerous unbanked people, who lacked prior credit history, into the mainstream financial services. This has opened up opportunities for people to access the whole gamut of financial services such as lending, borrowing, insurance, etc. Companies like InVenture through their app, Tala Kenya (formerly Mkopo Rahisi) or M-Shwari, an application jointly developed by Commercial Bank of Africa and Safaricom, offer microloans to individuals in Kenya based on their social media and mobile usage habits (Alushula, 2015). In the case of M-Shwari, the easy access to subscriber's usage data from M-Pesa aids in the decision-making process. The same holds true for Tala Kenya. For analysing risks, these companies use a set of data points, like prior transaction history, social network activity,

education, employment status, browsing history, spending patterns (from mobile money), etc. to gauge the creditworthiness of the borrower. Reference from existing customers is also given importance. These companies had a successful return rate of over 90 per cent, which is in sync with established financial institutions in those regions. Also, more than 95 per cent of customers return for another loan (Wamathai, 2016). So, this proves that the newer business models led by fintech can still make successful finance without necessarily following the practices undertaken by traditional lenders.

By granting the first loan, the fintech companies have succeeded in creating a credit history for their customers, who never had one. This will aid them in their capital-raising application with formal financial institutions. This way, fintech is helping to expand the size of the industry. At present, the loan ticket size is restricted, therefore for bigger loans customers will have to approach traditional financial institutions. But these fintech have managed to fill the void in financial intermediation.

Agility

Unlike traditional financial institutions, the business models of fintech rely on the latest technology and data analysis; thus, it helps them in being agile. Another important factor is that these companies are asset light; and hence, response to changing external environment is relatively much faster. Because of their agility, these companies are able to accept or reject a finance transaction in approximately two minutes (after the initial registration process which may take approximately ten minutes), which makes them ideal for people who are looking for financing in an emergency, which is the case with a reasonable number of users of these services. This also makes it a differentiating factor from a bank which may take a few days or even weeks to process a loan application.

Capital raising

SMEs contribute over 60 per cent to the GDP in low-income countries, whereas the share rises to almost 70 per cent in middle-income countries and it is over 60 per cent in high-income countries also. What is important to be noted here is that the share of SMEs in the informal sector is higher in low-income countries and it decreases as we move to middle-income countries and declines further in high-income countries.

When it comes to employment generation, MSMEs are the backbone of the countries in the low-income group. Every four out of five people are employed in the MSME sector. In the lower- middle, upper-middle and high-income countries, MSMEs employ three out of five people. This indicates the importance of these companies in employment generation and propelling the economy.

MSMEs, who are the real drivers of growth and employment globally, often face difficulties in raising capital. As a sizeable number of these companies do not

have sufficient collateral to offer for the loan, getting a secured loan is difficult and the risk is high for unsecured lending. Stock exchanges are an option, but the increased cost of regulatory compliance coupled with the compliances themselves deter most of these companies. Also, with limited options of Sharī'ah-compliant borrowings, most MSMEs resort to their own capital, which often hinders their growth and expansion prospects. But fintech has the potential to change this trend. The technology-backed newer models like crowdfunding and peer-to-peer platforms are enabling MSMEs to raise capital. According to the BCG report, after payments, lending and crowdfunding space have attracted the maximum investments of nearly $20 billion (BCG, 2017). Investors with a high-risk appetite can fill the financing deficit which these MSMEs are facing. It is an ideal win-win situation for both the capital investor and the receiver.

For example, in India, which has the second highest population of Muslims globally, the regulatory environment for offering Sharī'ah-compliant products and services is not very favourable. Amongst the three major financial sector regulators, only the capital market regulator Securities and Exchange Board of India (SEBI) has displayed some willingness for Sharī'ah-compliant products and services. It is this window which has helped a company like Rehbar, a Sharī'ah-compliant crowdfunding platform, to help businesses raise capital. Since its inception in 2013, Rehbar has completed over 500 deals and raised over INR384 million (circa USD 5.6 million). For its services, Rehbar charges either a commission or a share in profits or both. Platforms like Rehbar are a boon to business owners who intend to stay away from raising capital from banks and other financial institutions owing to the prohibited element of *ribā*. Such businesses can leverage such fintech-based Sharī'ah-compliant financing and continue to expand their business activities. Another key advantage of these platforms is the speed at which finance can be raised. If it is an attractive investment proposition, the company can raise desired funds within hours on these platforms. Another advantage of fintech-based capital raising platforms is accessing financing for invoice, supply-chain and trade finance, which is a big area and will positively influence the working of MSMEs.

How Sharī'ah-compliant fintech solutions enhance financial intermediation

Islamic finance is working in the same ecosystem as traditional finance and has had little or no impact in addressing the challenges of the real economy. Fintech provides an opportunity for Islamic finance to make a meaningful impact and address some of the key challenges facing the real economy. Table 5.2 explains the future potential direction and scope for fintech in enhancing Sharī'ah compliance of financial intermediation.

For example, crowdfunding or peer-to-peer financing platforms have the potential to link capital to the potential or performance of the business. Also, more than two-thirds of the portfolio of Islamic finance banks is trade-based

TABLE 5.2 Potential direction and scope for fintech in enhancing Sharī'ah compliance

Activities	*Segments*	*Sharī'ah regulatory challenges*	*Business challenges*	*Fintech solutions*
Financial intermediation	Banks	Interest-based	Moral hazard Adverse selection	Payment banking Crowdfunding
	Finance companies	Interest-based	Moral hazard Adverse selection	DLT EKYC
Direct finance	Capital market	Interest-based Short selling allowed Only listed stock permitted	Mixing of *halal* and *haram* businesses Shariah screening	Better reporting and compliance Peer-to-peer Customised solutions The option of non-listed stock
Risk management	Insurance	Trading of risk For-profit only High entry and exit barriers	Moral hazard (embellishment and repudiation of claims) Cherry-picking and lemon-dropping	Community-based insurance on mutual principles

(*murābahah* and *ijārah*) and a small portion is based on equity. Fintech provides an opportunity for Islamic financial institutions to increase their equity capital base.

Traditionally, Muslims have stayed away from the financial sector owing to Islamic prohibitions of *ribā*, *gharar* (speculative risk) and *maysir* (gambling and other games of chances). As a result of these, the extent of financial exclusion is very high within the community. But fintech, through unique payment solutions, Distributed Ledger Technology (DLT) and smart contracts, is helping to bring more and more people within the sphere of financial services. Due to financial inclusion, the use of services such as investment advisory and platforms like crowdfunding and peer-to-peer financing is only likely to increase.

Technology like blockchain has the potential of reducing the prevalence of moral hazard and agency problem. For example, one of the biggest challenges in *mudārabah*- and *mushārakah*- based financing is the cost of monitoring, which at times makes it financially unviable. Blockchain, through its DLT, has potential to reduce information asymmetry and the trust gap and can help improve transparency and reporting and thus help improve compliance and ultimately reduce cost, which can make these contracts more competitive and Sharī'ah-compliant.

Conclusion

The recent advances in the use of technology in offering financial products and services are a much-needed boost for the Islamic finance industry. Technology has the potential to overcome the limitations and challenges faced by traditional, as well as Islamic, financial institutions in providing access to capital to the masses and SMEs. Technology can reduce the information asymmetry which is one of the biggest challenges faced by the financial institution while extending credit. Blockchain and DLT have the potential to reduce/eliminate moral hazard from business and subsequently reduce the risk premiums for businesses (World Economic Forum, 2015).

The rise of technology platforms like crowdfunding and peer-to-peer lending will encourage individuals and businesses to seek equity-based financing to meet their requirements which, hitherto, has been difficult, and, in the process, will help in upholding Sharī'ah compliance. Fintech provides Islamic finance with an opportunity to strengthen its foothold in the existing markets and expand rapidly in newer geographies while being on the right side of Sharī'ah compliance and local regulations governing the financial markets.

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6

E-COMMERCE AND ISLAMIC FINANCIAL INTERMEDIATION

Hafis Bello

Introduction

Advancements in technology have continued to shape different aspects of human endeavours. In some cases, these technologies have been identified as disruptors in different sectors of the economy including commerce and banking. The convenience, speed of transaction processes and lower costs are often identified as some of the key driving factors for speedy adoption of these technologies. Similarly, access to a range of technological devices and the natural instinct of humans to engage in the exchange of goods and services have evolved into the modern electronic commerce system. Building on the successes recorded since its inception in 1972 when the Advanced Research Projects Agency Network (ARPANET) was used to arrange sales between students at the Stanford Artificial Intelligence Laboratory and the Massachusetts Institute of Technology (Laudon and Traver, 2014), electronic commerce (or e-commerce) platforms have continued to evolve into more interactive and efficient platforms to deliver excellent goods and services that meet consumer needs and expectations.

Several e-commerce platforms have thus been developed to enhance consumer shopping experiences. The emergence of top e-commerce platforms such as Amazon, aliexpress, eBay and many other online platforms in different geographical locations has provided consumers with more choices. Consumers are able to gather product and price information from e-commerce platforms from any location using their internet-enabled devices, thus empowering consumers to make more informed decisions at a time when people demand more time for other productive activities. Online shoppers, particularly, find these platforms appealing due to the convenience and competitive prices of goods and services. The ease and quick responses to enquiries via these online channels have further endeared the platforms to various consumer categories.

Although e-commerce platforms have continued to gain acceptability among various consumer categories, there have been growing concerns about the compliance of some platforms with Islamic finance principles. While it appears that e-commerce is merely a platform for enabling commercial activities online, it is important to examine whether some Islamic principles relating to commercial activities could help to enhance the current customer experience through practical case studies. In enhancing Islamic financial intermediation, certain Islamic principles are relevant to e-commerce. Such principles, though similar to the regulatory frameworks in most jurisdictions and specifically the terms and conditions of use of the platforms, the faith premium embedded in Islamic principles is expected to enhance compliance with the rules; hence, the significance of Islamic e-commerce platforms. Therefore, this chapter examines some of these concerns and recommends solutions that could further enhance these platforms, especially from the Islamic point of view. The rest of the chapter is divided into four major sections. Section one discusses the nature, processes and models of e-commerce. Section two examines the types of e-commerce platforms, while section three identifies the link between Islam and e-commerce. Section four discusses practical case studies, Sharī'ah-compliant mobile payments and e-commerce solutions by Islamic banks.

E-Commerce: Nature, processes and models

E-commerce is business occurring over networks which use non-proprietary protocols that are conducted via the internet (OECD, 1999, p. 28). In other words, e-commerce is the processing and transmission of data relating to commercial transactions over the internet. It covers various commercial transactions between and among individuals, organisations, governments and other stakeholders who are able to interact via their internet-enabled devices, anytime and anywhere. E-commerce offers equal platform to large businesses, as well as small and medium-scale enterprises (SMEs) to operate in the global market-place; and for regional businesses and communities to participate in social, economic and cultural networks seamlessly beyond geographical boundaries (Mary-Anne, 1998). It creates a dynamic blend of communication services, business applications, data management as well as integrative security mechanisms that facilitate the exchange of goods and services among these stakeholders (Lallana et al., 2000).

Nature

E-commerce involves the use of electronic communications and digital information-processing technology in business transactions to create, transform and redefine relationships for value creation among the stakeholders (Lallana et al., 2000). Aside exchange of goods and services, e-commerce also facilitates value-added services such as banking, billing, payment facilitation, marketing, training, online publishing, corporate services, marketing, secure data access, as well as the facilitation of insurance and travel, via online channels.

Electronic commerce offers individuals and organisations great benefits at relatively lower costs. Buyers are able to review products online and make purchase decisions without incurring transportation costs; sellers can also display a wider range of products under different product categories thereby making it easy for consumers to locate; teams in different locations are able to easily communicate, share ideas and business information, design and build new products/services to meet customer expectations and conclude on marketing campaign programmes.

In addition, e-commerce facilitates the purchase and sale of products and services, the delivery of efficient customer services, improved communication channels between organisations and their clients, team collaboration, information search, post-sale support services, advertisements and information access, as well as software support services. Some of the current e-commerce services include purchases of household goods, electronic products, gifts and personal effects from online stores, flight bookings and ticket purchase, banking services, international money transfers, crowdfunding and marketplace financing, purchase and sale of stocks from different stock exchanges, accessing educational resources and services and lots more. The growth of e-commerce across various sectors of the global economy has been facilitated by its ability to generate greater revenue at lower costs of operations. Organisations are able to display their goods and services in ways that reach consumers from all over the world. Also, with the click of a button, the consumer is able to access several products from different organisations, compare prices, conduct product reviews, and check feedback from current users.

Process

Specifically, activities conducted via e-commerce include advertising, offering, sale, invoicing, paying, matching, delivery and resolving. First, *advertising* in e-commerce enables a seller to communicate information on the products and services. Second, in *offering*, the seller is able to offer products and services to a wide spectrum of consumers across geographical boundaries. The consumers browse through desired products or services online. Third, *sale* involves actual purchase of products or service. The consumer selects the desired items and the system sends those items to the shopping cart. Fourth, in *invoicing*, the seller generates a sales order or invoice indicating items selected by the user and the final total price. Fifth, for *paying*, the buyer provides payment instructions such as card information. This is then forwarded electronically to the card issuer for payment processing. Sixth, in *matching*, if the payment is successful, the application matches payment information with the orders and feeds the result into the back office. Seventh, *delivery* depends on the nature of the services provided by the seller. In most cases, the seller delivers the items to the buyer's address or pick-up is arranged at the seller's store. There is also the possibility of using a third-party service for delivery. Eighth, in *resolving*, as usual with any sales processes, there is sometimes the need to resolve issues that come up during the sale process or

at post-delivery stage. In normal situations, both parties are able to work out a solution to the issues that may come up.

Stakeholders' business models

The emergence of e-commerce has led to different stakeholders' business models such as merchant model, advertising model, brokerage model, infomediary model and subscription model.[1] The major stakeholders' models in e-commerce are explained in the next section.

The merchant model is a business model that enables businesses to offer their products directly to the consumers over the internet. This eliminates the need for middlemen and associated costs. Companies that use this model are able to study consumer behavioural patterns, segment target markets and offer products or services that satisfy the need of each market. A popular major brand that adopts this model is Amazon.

The brokerage model provides a "marketplace" opportunity for buyers and sellers to meet. The service or "marketplace" provider usually gets commission on the transactions conducted via the platform. The model is being used effectively by disruptive technologies such as Uber, Airbnb, as well as crowdfunding platforms such as CircleUp, Angelist, Seedrs, FundersClub, among others.

Advertising model. This model provides a platform or service that attracts users to a website. Social media users identify with this model through their abilities to reach out to their social circles, friends and loved ones. Although the service offered by the platform provider is mostly free to the individual users, the site provider gets its income through businesses that wish to advertise their products to these individual users. Examples of such services include Facebook, LinkedIn, Twitter, Snapchat, etc.

Infomediary model. This model involves collection, collation and analysis of consumer and business information with the aim of selling such information to interested organisations to aid marketing purposes. Depending on the target audience, some of the information usually gathered includes names or nicknames, email addresses, phone contacts, business addresses, gender, etc. Providers of the platform use different techniques to gather this information from individuals and businesses. Monetary and non-monetary incentives are sometimes utilised by platform providers. In some cases, technology tools are also utilised to gather information on browsing behaviour, location, site visits, IP addresses, time spent on each site, etc. Examples of users of this model include VConnect, Netzero and bizrate.

Subscription model. This is an e-commerce model whereby service providers sell their services to clients based on subscriptions. In some cases, providers offer few free segments of the service and require consumers to pay subscriptions to access other parts of the services. This model is mostly used by online

game providers and business news media such as *The Economist*, *The Wall Street Journal*, among others.

For companies, e-commerce brings variety and low barriers to entry, significant opportunities for cost cutting, capacity for rapid creation of business processes and great opportunities to sell across borders. Each of these potential benefits contributes to increased competition and the ability to take market leadership from proven market players. On the other hand, in its simplest form, e-banking basically includes the delivery of information about the bank and its services through its homepage. More sophisticated internet-based services supply customers with access to their accounts, the ability to transfer money between different accounts, online payments or loan applications and other financial products.

Major types of e-commerce

Although e-commerce refers to the exchange of goods and services, the players vary according to the nature of the transactions. The major types of e-commerce are Business-to-Consumer (B2C), E-Commerce as a Service (EAAS), Business-to-Business (B2B), Business-to-Government (B2G) and Consumer-to-Consumer (C2C).

Business-to-Consumer (B2C): This is a form of e-commerce whereby businesses sell their range of products or services directly to the end users. It facilitates information-gathering from the customer, aids purchasing physical and digital goods and products, as well as receiving products over an electronic network (Lallana, et al., 2000). Kalakota and Whinston (1997) noted that the more common applications of this type of e-commerce are in the areas of purchasing products and information, and personal finance management, which pertains to the management of personal investments and finances with the use of online banking tools (e.g. Quicken).

According to Statista, the worldwide retail e-commerce sales for B2C was US$2.3 trillion in 2017, representing 10.1 per cent of total retail sales. In Figure 6.1, the sales are projected to consistently increase to $4.8 trillion in 2021 accounting for more than 16 per cent of estimated global retail sales for the year.

B2C e-commerce reduces transactions costs by facilitating consumers' access to product or service information as well as ensuring price reviews. B2C e-commerce aids businesses through the provision of low-cost alternatives since the ownership and maintenance costs of the website are relatively lower when compared with the "brick-and-mortar" structure of a firm (Zorayda, 2003). B2C e-commerce also offers excellent distribution network for digital products and services.

E-Commerce as a Service (EAAS): This is a variant of B2C. Businesses using the EAAS model also sell products directly to consumers; however, they do not

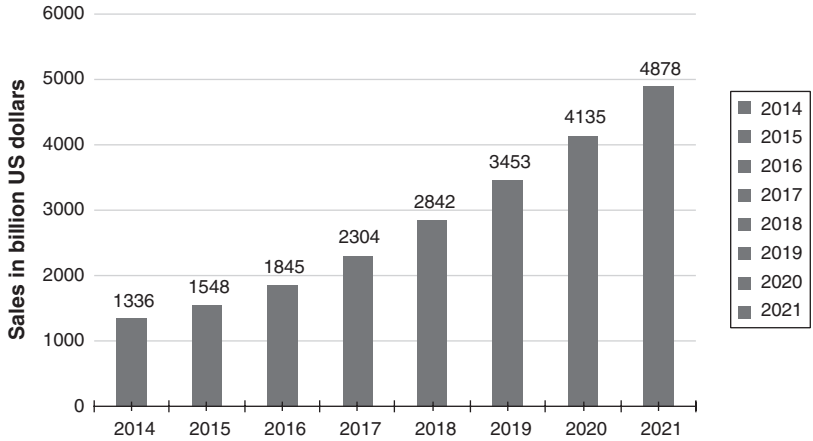

FIGURE 6.1 Retail e-commerce sales worldwide from 2014 to 2021 (in billion US dollars).

Source: Statista (2018a)

own any inventory. Rather, the platform owners only provide an online channel for manufacturers and retailers to display, and ultimately sell, their goods. EAAS providers operate more like an advertising and sales agency, and invest heavily in platform stability, security and robust functionality. In addition to sales, EAAS platforms ensure consumer protection through effective monitoring, tracking, product delivery system, customer service and refund systems. Sale proceeds are received by the EAAS provider through a fully developed online or mobile payment system and only delivered to the manufacturer or retailer when the consumer confirms product receipt and quality. Examples of businesses using this model are Aliexpress.com, ebay.com, Jumia.com, etc.

The B2C businesses also have physical business spaces/stores, and customer service representatives that respond to customers who visit the stores to return or replace products purchased via online services. Generally, the B2C e-commerce tools enable businesses to handle some major activities such as the display of product information and prices, ordering, payment, product delivery and customer support services. To enable consumer review and make purchase decisions, B2C e-commerce businesses provide product information, availability and prices via online stores. The consumer is thus able to review and make purchase decisions. Upon confirmation of purchase interest, the consumer has the option to pay online or upon product delivery. Usually, selected products are delivered to the client through in-house logistics or a third-party shipping company such as FedEx, Aramex, DHL, UPS, etc.

Business-to-Business (B2B) e-commerce refers to a business that sells products and services to another business through the web. It describes the electronic exchange of goods, information and services between businesses at the level of manufacturers, wholesalers and retailers as opposed to between companies and the general public or governments. B2B e-commerce facilitates processing of orders digitally rather than through manual, telephone or email dealings. In B2B e-commerce, the finished products of a company are often the result of multiple B2B transactions that establish a supply chain and furnish it with the goods and materials needed to manufacture that product (Statista, 2018b). For instance, an automobile company engages several other businesses in B2B transactions such as electrical components, windscreen glasses, tyres and upholstery components for its vehicles.

About 80 per cent of e-commerce takes place as B2B transactions, and most experts predict that B2B e-commerce will continue to grow faster than the B2C segment. Figure 6.2 indicates consistent growth in the B2B e-commerce transaction reaching up to US$7.661 trillion in 2017. The consistent growth in B2B transactions is linked to the various components and value-add processes involved in the transactions such as logistics (e.g. Procter and Gamble), enterprise resource planning applications (e.g. Oracle and PeopleSoft), outsourcing and webhosting services (e.g. Network solutions and e-Share), auction solutions software (e.g. eBay and Listia) and content management software (e.g. Drupal and WordPress).

Business-to-government e-commerce or B2G refers to the processing and transmission of data relating to commercial transactions between companies and

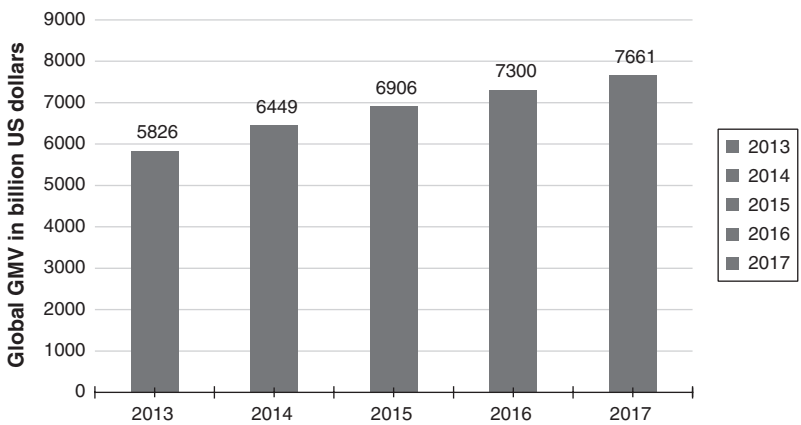

FIGURE 6.2 Global B2B e-commerce gross merchandise volume (GMV) from 2013 to 2017 (in billion US dollars).

Source: Statista (2018b)

the government or government agencies and corporations via electronic channels. Generally, governments solicit businesses from the private sector through requests for proposals (RFPs) for transactions relating to public procurement, government auctions, licensing procedures and training and facilities upgrade, as well as other government-related operations. Governments participating in such processes do put in place well-structured and clearly defined web-based purchasing policies to ensure transparency of the procurement process, reduce irregularities and promote efficiency. When compared to B2C e-commerce and B2B e-commerce, B2G e-commerce has the lowest transaction value, as government e-procurement systems remain largely underdeveloped (Kalakota and Whinston, 1997).

Consumer-to-consumer e-commerce or C2C refers to the innovative ways consumers process and transmit data relating to commercial transactions via the internet. C2C e-commerce is facilitated by a third-party (or platform provider such as eBay) that generally charges a flat fee or commission. The cost of using third-parties is declining, and the quantity of products for sale by consumers is steadily rising due to the emergence and growing popularity of social media sites such as Facebook and Twitter for free advertisements. Retailers consider C2C e-commerce to be an important business model due to the growing popularity of social media and other online channels.

Some of the enabling services for C2C e-commerce include the growth of electronic marketplaces, peer-to-peer (P2P) lending sites, crowdfunding and online auctions. Generally, C2C e-commerce transactions are conducted in different forms such as the following (Zorayda, 2003):

- auctions facilitated by an online marketplace such as eBay, which allows online real-time bidding on items being sold via the internet;
- peer-to-peer systems, such as Facebook, WhatsApp, WeChat and Twitter and other file-exchange and later money-exchange models; and
- classified ads at portal sites that offer an interactive, online marketplace where buyers and sellers can negotiate such as Craigslist, olx.com, Excite Classifieds ("Buyer Leads & Want Ads").

Islam and e-commerce

Having reviewed the e-commerce ecosystem, it is pertinent to note that there have been several reported cases of fraud, poor quality of products delivered and delays in the delivery of products. Other identified risks include threats of online security, system reliability, privacy issues, products not fitting online descriptions, credit-card fraud and violation of intellectual property rights. These challenges, particularly those that relate to poor quality of products and fraud, violate fundamental principles of Islamic commercial law. In Islam, there are general rules that regulate most of the risks identified earlier. Therefore, before discussing specific

case studies of Sharī'ah-compliant mobile payment solutions as well as e-commerce solutions by institutions offering Islamic financial services, it is appropriate to give a general overview of fundamental principles on commercial transactions in Islam which could be transposed to e-commerce transactions.

Exchange of goods and services, engagement in productive endeavours and rendering valuable services to human society are essential forms of economic activities in Islam. The concept of economic development in Islam is enlarged to become a comprehensive concept with three main goals: human resource development; manufacturing of effective and useful items; and improvement in quality of life. Islam not only encourages hard work and engagement in productive economic activities, it also acknowledges the diversity of human desires and economic pursuits as laid down in numerous verses of the Qur'an (see Qur'an 53:39–40; 2:149; 2:275).

It is thus clear that commerce is not only permitted in Islam, but strongly encouraged. However, unlike what operates in conventional businesses, transactions in Islam are required to be conducted with the fear of Allah, and service to humanity; hence, the spiritual dimension or faith premium in commercial transactions is a unique feature that is exclusively embedded in Islamic e-commerce solutions. Prophet Muhammad (pbuh) said:

> The feet of the slave of Allah shall not move (on the Day of Judgment) until he is asked about five things; About his life and what he did with it, about his knowledge and what he did with it, about his wealth and how he earned it, and where he spent it on, and about his body and for what did he wear it out.
>
> *(Al-Tirmidhi, 2007)*

Thus, profit-making, although permissible, should be balanced with the desire to assist others and ensure the development of society. This is one of the reasons for the concept of *zakat* (compulsory alms), whereby the rich are required to give a specified portion of their wealth to assist the poor. Thus, wealth in Islam is not seen as an end, but a means to an ultimate end – attainment of God's pleasure.

As a form of business endeavour, e-commerce falls under commercial transactions or *fiqh al-mu'āmalāt*, which is one of the main aspects of the Sharī'ah. Therefore, Khan (2010), Shanmugam and Zahari (2009), and Zainul et al. (2004) identified basic guidelines on business transactions in Islam. These basic guidelines are applicable to e-commerce transactions, and when properly considered and applied in the structuring of the end-to-end operations of e-commerce platform will ensure consumer protection and satisfaction regardless of the model.

(i) Prohibition of transactions involving usury (*ribā*), excessive speculation or uncertainty (*gharar*), gambling and games of chance (*maysir*) and harmful items such as the sale of alcohol and the illegal arms trade.

(ii) Business transactions should exclude any form of exploitation from either party. This requires exact product description while advertising a product online.
(iii) There should be risk-sharing with a symmetrical risk/return distribution amongst participants in a transaction.
(iv) Business transactions should be linked to a real economic transaction. That is, it should involve material-finality.
(v) Sanctity of contract: Islam regards the contract as highly important and parties are required to be truthful and adhere to the contractual terms.
(vi) Avoidance of false advertisements and misrepresentation. Fraud is condemned in primary sources of the Sharī'ah, and therefore prohibited in all commercial dealings, including on e-commerce platforms.
(vii) Contracting parties should give accurate measurement and weights as agreed with the other party. This is an inherent feature in Islamic commercial transactions which helps to prevent disputes.
(viii) Avoid hoarding and undue profiteering. Islam frowns on undue profiteering, including hidden charges not disclosed upfront. Many e-commerce disputes experienced today would be avoided if this principle were upheld as a general rule.

These guidelines, if well implemented in e-commerce transactions, will help in overcoming the risks identified earlier. It is important to emphasise that the general rule in Sharī'ah is that every economic activity is permissible as long as it does not explicitly contradict the Sharī'ah. Thus, being a tool to facilitate and ensure business transactions between stakeholders, e-commerce is considered permissible (Millar and Anwar, 2008; Zainul et al., 2004; Alotaibi and Asutay, 2014).

The Sharī'ah Standard No. 38 of the Accounting and Auditing Organisation for Islamic Financial Institutions (AAOIFI) regulates online financial dealings. It indicates conditions that guide the design and promotion of a business website. The standard emphasises that such sites should not showcase any non-Sharī'ah-compliant product or services, nor use Sharī'ah-prohibited means to promote *halal* goods and services. The standard also indicates permissibility of concluding online contracts, provided that the contracts align with the general rules of Islamic financial transactions (AAOIFI, 2010). Sections 5, 6 and 7 of the Standard indicates that an offer and acceptance in online contracts can be in any form that indicates the consent of the two parties to conclude the contract. With respect to effective contract time, the standard notes that an online contract is considered to be valid at the time when the other party accepts the offer irrespective of whether the offering party is aware of the acceptance or not. Section 38 also notes that possession is required to take place through all accepted methods of actual and legal possession, in line with the Sharī'ah (AAOIFI, 2010).

Islamic banks and e-commerce solutions

Against the backdrop of the principles of Islam and their application in e-commerce, as discussed in the previous section, it is expedient to examine how Sharī'ah-compliant mobile payment solutions and credit cards have been introduced to enhance e-commerce transactions, particularly through the banks. In addition, specific case studies from Malaysia and the United Arab Emirates (UAE) are analysed to briefly identify some e-commerce solutions provided by Islamic banks in the two leading Islamic finance jurisdictions.

Sharī'ah-compliant payment solutions

Undoubtedly, payment is at the core of commercial transactions and exchange of goods and services. The prevalent method of payment for e-commerce is the use of credit cards, which usually involves charging of interest, thereby contradicting Islamic principles. This has been a key concern about the Sharī'ah compliance of electronic payments in e-commerce transaction. To resolve this challenge, several mobile payments systems have been developed to enable Muslim online shoppers to enjoy the benefits of e-commerce while complying with the dictates of the Sharī'ah. Some of these solutions include Sharī'ah-compliant credit cards from Islamic banks across the world.

Many Islamic banks have rolled out Sharī'ah-compliant credit cards to enable their customers to transact and pay for products on online e-commerce platforms. These bank cards are typically in partnership with major online payment gateways such as Visa and MasterCard but they do not generally involve any interest, joining fee or annual fee. In addition, some debit cards also support e-commerce transaction. This means bank customers will only have access to their money for online transactions and are thus not charged interest fee on credit facilities. For instance, CIMB Islamic in Malaysia offers a bouquet of credit cards such as the CIMB Islamic Bank Platinum Credit Card and CIMB Islamic Bank Petronas Gold Credit Card, while Mashreq Bank has a range of credit cards such as the FIFA Mashreq Credit Card, Solitaire credit card, Platinum elite credit cards, among others. Mashreq also encourages its customers to use the bank's cards through awarding salaam points on transactions, as well as customised services to eligible customers, such as access to lounge services and airport drop-off and pickup services. Also, the Dubai Islamic Bank in Pakistan has gone further to adopt the IRIS middleware which integrates easily with innovative alternate delivery channels and can be used by bank customers to conduct transactions over the automated teller machines (ATMs), point of sale (POS) machines and e-commerce sites. Generally, many Islamic banks adopt the *murābahah* contractual arrangement in their respective e-commerce payment processes where a customer can instruct the bank to pay the seller on his/her behalf and he/she buys back the product and makes payments in instalments.

Case studies of E-commerce solutions by Islamic banks

Islamic banks have continued to rebrand their operations and service offerings to the delight of their numerous customers. Due to strict regulations, risk factors and low technical know-how, Islamic banks have not been able to fully operate within the e-commerce space. Most Islamic banks consider internet banking as a form of e-commerce while some others have moved further by partnering with reputable organisations to render e-commerce services to their clients. This section thus examines the e-commerce operations of selected Islamic Banks in Malaysia and the United Arab Emirates.

In Malaysia, Bank Islam Malaysia Berhad offers customisable e-commerce solutions aimed at mitigating inward transaction processes of their customers. A closer review of the bank's offering indicates it offers an electronic payment system that enables customers to make instant payments for transactions conducted over electronic channels. In addition, information on the bank's website noted that it offers Financial Process Exchange (FPX): an alternative B2C and B2B payment channel for payment at e-marketplaces such as websites and online stores. The FPX also allows the bank's customers to collect bulk payment for purchases made via online shopping platforms. The bank also offers Mastercard Internet Gateway Services, which is an online payment service that is integrated with the e-commerce sites of the banks' customers. Buyers on such websites are then able to use their credit cards for payment purposes.

Similarly, CIMB Islamic Bank Berhad in Malaysia has partnered with e-commerce service providers such as Lazada Malaysia to provide enabling funding and payment support solutions to merchants on the e-commerce marketplace. Among other numerous services provided by the bank, it offers Plug n Pay, a Mobile Point of Sale (MPOS) solution created to empower businesses with secure, cashless transactions via smartphones and tablets. It also provides an Online Instalment Programme, which is designed to enable the bank's customers to opt for interest-free monthly payments through the online platform. In addition, it offers CIMB Pay, which is the bank's mobile payment solution that enables customers to use their mobile phones as a wallet, thus giving them an opportunity to enjoy payment on the go. More importantly, CIMB provides an e-commerce platform for merchants. This is an online service for merchants to access and view e-commerce transactions via a CIMB-secured payment gateway. The bank noted that its secured e-commerce platform is offered free to eligible customers.

In the UAE, Mashreq bank prides itself on being the best consumer digital bank in the country. Information available on the bank's website indicates that it has an e-commerce platform designed to provide end-to-end services to its customers through online channels. Some of the platform's features include:

1. Ease of integration with third-party applications and services.
2. Convenient checkouts and data security through tokenisation. The use of tokens provides an additional security layer on transaction data.

3. Smart dynamic routing. This facilitates the use of multiple payment gateways to reduce system downtime.
4. Retry option for a declined transaction. The bank platform indicates that its e-commerce platform retries declined transactions at three different times towards increasing the number of successfully processed transactions.
5. Email and SMS-based invoice payments. Payment notifications sent to customers on transactions processed via their respective bank accounts.
6. Multi-currency support. The bank offers payers the option of completing transactions in any currency of choice.

Mashreq bank also noted that it has a platform that supports social network payments, customised responsive payment pages, smart analytics for smarter decisions and the fraud and risk management system.

Mashreq bank indicated that its customers are able to:

1. Create their social network portal through the bank's merchant dashboard.
2. Publish the campaign on preferred social media channel indicating product/service features, a "call to action" and price information.
3. Receive payments directly from buyers by accessing a single-click access to the mobile-friendly payments page.

The cases examined earlier indicate that the Islamic banks are at different levels with respect to e-commerce transactions and support for e-commerce services. For instance, while CIMB in Malaysia and Mashreq Bank in the UAE have made some progress with respect to providing e-commerce services to their customers, Bank Islam Berhad Malaysia still offers basic internet banking services to its customers with limited unique offers to support e-commerce merchants or integrate with the online shopping portals. Nevertheless, regardless of the type or model of e-commerce used, whether a mere payment solution or a full-fledged e-commerce platform, the most important factor is its ability to embed the key Islamic commercial law principles described in this chapter, which are often considered in the process of Sharī'ah approval of the mobile payment solutions implemented by Islamic banks.

Conclusion

The chapter discussed the evolution and different definitions of the concept of e-commerce. The chapter further discussed the functionality, processes, models and procedures in e-commerce. The chapter highlighted the Islamic commercial law principles that could enhance e-commerce platforms towards ensuring their wider acceptability and use among the Muslim populace in particular. While relying on sources of the Sharī'ah, it was noted that all transactions, including an e-commerce platform, are assumed *halal* or permissible in Islam unless and until a contradictory finding shows otherwise. The chapter further highlighted basic

guidelines on business transactions in Islam such as avoiding *ribā*, *maysir*, *gharar* and general prohibition of fraud and misrepresentation. The relevant sections of the AAOIFI standards were also discussed with clear indications on the rules guiding e-commerce transactions by the international standard-setting body.

It is therefore concluded that due to the huge benefits that could be realised from e-commerce services, many Islamic banks are gradually offering cutting-edge e-commerce services to support their customers. While a few of these banks still offer basic online banking services, many have gone further to provide seamless payment integration with e-commerce sites to aid direct payment for purchases made via e-commerce sites. Some Islamic banks have also partnered with e-commerce players in their respective jurisdictions, and provided accelerator platforms for e-commerce start-ups and developers. Despite the varying levels of adoption and supports for e-commerce, Islamic banks are generally inclined towards offering more e-commerce services so as to meet the changing needs of their respective customers.

Note

1 http://ocw.metu.edu.tr/pluginfile.php/352/mod_resource/content/0/Lecture_3.pdf

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PART III

Setting the Sharī‘ah parameters

7

FINTECH IN THE LIGHT OF *MAQĀSID AL-SHARĪ'AH*

Mustafa Omar Mohammed and Mohamed Cherif El Amri

Introduction

A few decades prior to the 2008 global financial crisis, fintech was cursorily mentioned in different studies. The term was somehow used to describe emerging technologies in the financial industry. However, after the global financial crisis, the world paid more attention towards this field that combines the finance, internet technologies, social networking services, social media, artificial intelligence and big data analytics (Lee and Shin 2018). In 2009, the world witnessed increasing proliferation of bitcoin. People who had become dissatisfied with the global financial system began appreciating the values emanating from the underlying bitcoin technology – blockchain – especially efficiency, transparency and trust.

The blockchain technology is considered an enhancer to the fintech revolution and is described as a "golden source", "a mechanism for shared, decentralized, replicated transaction records" (Tapscott and Tapscott 2016). In blockchain technology, the network timestamps transactions are hashed into an ongoing chain of hash-based proof-of-work, forming a record that cannot be changed without redoing the proof-of-work. The longest chain serves as proof of the sequence of events that it came from, the largest pool of CPU power. As long as the majority of CPU power is controlled by nodes that are not cooperating to attack the network, they will generate the longest chain and outpace attackers (Nakamoto 2008).

Similarly, just like the innovations witnessed in the financial landscape with the blockchain technology, Islamic finance has also witnessed innovations in several traditional institutions, products and services to support its growth and disrupt conventional financing models. At the institutional levels, the establishment of the standard-setting bodies such as the Bahrain-based Accounting and

Auditing Organisation for Islamic Financial Institutions (AAOIFI) in 1991 was a remarkable step forward. Since its establishment, AAOIFI has produced more than 107 standards as of end 2017 (AAOIFI 2018). Other notable institutions that evolved are the Islamic Financial Services Board (IFSB 2016) and International Islamic Liquidity Management Corporation (IILM) both established in 2002 and 2010 in Kuala Lumpur, respectively. These international bodies have introduced innovative standards and products to the market, which were hitherto not available in the global financial system.

The Islamic finance industry has expanded its products and services to include money markets and inter-bank money market products, capital market products, particularly *Ṣukūk* or Islamic investment certificates, Sharī'ah-compliant stocks in the equity markets, besides establishing various funds which varied with the risk appetite of its investors. This array of products and services is also a response to the increasing global demand for Islamic finance. This global demand is reflected in the market share and asset size of Islamic finance worldwide, an increasing number of non-Muslim countries and institutions offering Islamic finance products and services and the ethical attraction of Islamic finance. The development of these new products has been possible due to, among others, innovative financial engineering. The development and creative application of financial engineering have produced several structured products such as Islamic hedging facilities, profit-rate swap, Islamic indexes, Islamic Real Estate Investment Trust, liquidity instruments and Islamic social finance products.

Despite the remarkable progress that Islamic finance has achieved over the years, several issues remain relative to its future direction, especially in the wake of the fintech revolution. It is common knowledge that Islamic finance has been operating based on conventional rules, regulations and infrastructure over the past four decades since the establishment of the first Islamic bank in 1975. Therefore, the growth of Islamic finance has not been largely organic. This has also continued into the fintech era. It raises a few pertinent questions. Theoretically, the objectives of Islamic finance should conform to the objectives of Sharī'ah or *maqāsid al-Sharī'ah*. Over the years, evidence show that there has been a widening gap between the practices of Islamic finance and *maqāsid al-Sharī'ah*. Therfore, to what extent do fintech solutions in Islamic finance aspire to conform to fundamental principles of *maqāsid al-Sharī'ah*?

Islamic finance products and services are expected to be distinct, conforming to fundamental Sharī'ah objectives, which preserve wealth by prohibiting negative elements such as interest, speculations and gambling and encouraging positive values such as transparency, trust, fairness, equitable distribution of income and wealth, among others. Fintech, particularly the blockchain technology, embodies a substantial number of these Sharī'ah objectives, such as transparency and trust. Therefore, to what extent are there in existence fintech solutions in Islamic finance with distinct features conforming to these Sharī'ah objectives? Studies on Sharī'ah-compliant fintech have hardly responded to these pertinent

questions. The present chapter will show that there is a gap in the literature that has evaluated fintech in Islamic finance relative to *maqāsid al-Sharī'ah*.

The chapter is structured into six sections. Apart from this introductory part, section two discusses the potential of fintech, which includes its brief history, definitions and growth. Section three examines the fintech ecosystem, business models and applications. The fourth section focuses on the development of fintech in Islamic finance. Section five discusses *maqāsid al-Sharī'ah* and fintech. It also provides a *maqāsid* theoretical framework necessary for developing the dimensions and elements for measuring the fintech solutions in Islamic finance. Section six concludes the chapter.

The potentials of fintech

Financial technology embodies several key terms: change, marriage, growth, innovation, wave and disruption. For example, it is touted as a game changer – the revolution that is turning the financial services industry on its head (PWC 2016). Fintech is a new financial industry that applies technology to improve financial activities (Schueffel 2016). EY (2014) defines fintech as

> high-growth organisations combining innovative business models and technology to enable, enhance and disrupt FS [Financial services]. This definition is not restricted to start-ups or new entrants, but includes scale-ups, maturing companies and even non-FS companies, such as telecommunication providers and e-retailers.

Financial technology is a marriage of sorts between the financial services and technology sectors – a dynamic segment where technology-centric start-ups innovate the products and services traditionally offered by financial institutions (PWC 2016). Fintech encompasses a new wave of companies changing the way people pay, send money, borrow, lend and invest (Chishti and Barberis 2016). The evolution of fintech is seen both as an opportunity for firms to gain competitive advantage and a threat, particularly from start-ups.

As an opportunity, the disruptive power of platforms is also transforming the lives of individuals in ways that would have been impossible a few years ago (Parker et al. 2016). The fintech revolution will reshape finance – and improve it – in three fundamental ways. First, the fintech disrupters will cut costs and improve the quality of financial services. Second, the disrupters have clever new ways of assessing risk. Third, the fintech newcomers will create a more diverse and hence stable credit landscape.

On the other hand, studies show that a substantial number of companies feel threatened by the heat of fintech to their businesses. In a survey conducted by PWC (2016), around 82 per cent of Malaysian financial institutions were concerned about the threat fintech posed to their business compared to the figure of 73 per cent the study reported for Singapore. The results also show that 67 per

cent of the global counterparts are at risk to fintech start-ups. There are numerous cases where fintech start-ups have seriously disrupted the existing traditional businesses. The launch of Apple's iPhone in 2007 overtook Nokia's global mobile phone dominance. Nokia could not compete and produce a smartphone with similar features of Apple's iPhone, and thus Nokia was forced to sell its mobile phone business. Similarly, WhatsApp, founded in 2007 and later bought by Facebook, led to the decline of telecommunication companies managing SMS (Haycock and Richmond 2015). Parker et al. (2016), citing other disruptive fintech start-up cases, said that the smartphone-based car service, Uber, did not own a single car five years after its establishment in 2009, but was nevertheless valued at over $50 billion by investors. Meanwhile, the China-based retailing giant, Alibaba does not own a single inventory or item but has been dubbed the world's biggest bazaar as it features nearly a billion different products on just one of its many business portals.

The growth of fintech has been phenomenal. Nasdaq (2017) reported, in an article entitled "State of Fintech for 2017", that for the last several years investments in fintech skyrocketed from just $3 billion to over $40 billion in 2015. Global investment in fintech ventures in the first quarter of 2016 was reported to have reached $5.3 billion, an increase of 67 per cent and the percentage of investments going to fintech companies in Europe and the Asia-Pacific nearly doubled to 62 per cent. With regard to cryptocurrencies, the total market capitalisation surpassed $550 billion USD by January 2018, distributed by over 1,460 different coins and tokens. This shows an annual increase of about 3,200 per cent from about $17 billion using 617 coins in 2017 (Coinmarketcap 2018).

The fintech ecosystem, models and applications

Analysing Fintech ecosystem is vital in understanding the dynamics in its innovation and competitive environment. Lee and Shin (2018) have identified five elements of the fintech ecosystem. First, the fintech start-ups involved in payment, wealth management, lending, crowdfunding, capital market and insurance fintech companies. Second, technology developers in the areas of big-data analytics, cloud computing, cryptocurrency and social media developers. Third, the government, which basically comprises financial regulators and legislature. Fourth, the financial customers who are individuals and organisations, and finally the traditional financial institutions such as traditional banks, insurance companies, stock brokerage firms and venture capitalists. These elements symbiotically contribute to innovation, stimulate economy, facilitate collaboration and competition in the financial industry and, ultimately, benefit consumers in the financial industry (Lee and Shin 2018).

The following six fintech business models have been identified by Lee and Shin (2018): 1) payment business model, which is relatively simple to offer, compared to other financial products and services; 2) wealth management business model – one of its more popular fintech business is the automated wealth managers

(robo-advisors) that provide financial advice for a fraction of the price of a real-life adviser; 3) crowdfunding business model, which empowers networks of people to control the creation of new products, media and ideas for raising funds for charity or venture capital. Three parties are involved in crowdfunding: the project initiator or entrepreneur who needs funding; the contributors who may be interested in supporting the cause or project; and the moderating organisation that facilitates the engagement between the contributors and the initiator; 4) lending business model – P2P consumer lending and P2P business lending is another big trend in fintech; 5) capital market business model, which caters for the full spectrum of capital market areas such as investment, foreign exchange, trading, risk management and research; and 6) insurance services business model that works to enable a more direct relationship between the insurer and the customer. They use data analytics to calculate and match risk, and as the pool of potential customers broadens, customers are offered products to meet their needs.

In addition, there are several fintech applications. The following are the salient ones. First, the blockchain technology, which is a publicly accessible, distributed ledger that was initially designed and implemented to enable bitcoin transactions. It is a piece of IT infrastructure that serves as a database which is used to keep a continuously growing list of records – so-called blocks (Schueffel 2017). Second, cryptocurrencies, which are digital currencies in which encryption techniques are used to control the generation of units of currency and verify the transfer of funds, operating independently of a central bank. Cryptocurrency businesses oftentimes raise money through ICOs (Schueffel 2017). Third, smart contracts, whose terms are recorded in a computer language instead of legal language, can be automatically executed by a computing system, such as a suitable distributed ledger system (Walport 2016). Fourth, open banking, a concept that leans on the blockchain and posits that third-parties should have access to bank data to build applications that create a connected network of financial institutions and third-party providers. An example is the all-in-one money-management tool, Mint. Fifth, the InsurTech, which refers to the use of technology innovations designed to squeeze out savings and efficiency from the current insurance industry model (Frankenfield 2018; Bergstra 2015). Sixth, RegTech, which seeks to help financial service firms meet industry compliance rules, especially those covering Anti-Money Laundering (AML) and Know Your Customer (KYC) protocols, which fight fraud. It is a new domain within the financial industry that applies technology to improve regulatory processes, especially with regards to KYC and AML. Seventh, Regulatory Sandbox, which is a supervised space, open to both authorised and unauthorised firms. It provides a set of rules that allows innovators to test their products and services in a live environment without following some or all legal requirements, subject to predefined restrictions (Schueffel 2017). Eighth, robo-advisors, which is a self-guided online wealth management service that provides automated investment advice at low costs and low account minimums, employing portfolio management algorithms.

Ninth, unbanked/underbanked services that seek to serve disadvantaged or low-income individuals who are ignored or underserved by traditional banks or mainstream financial services companies. The unbanked is a characteristic describing people who do not use banks or financial institutions because they do not have access to banking services or because they prefer cash transactions outside the banking system; while the underbanked is a characteristic describing people who do not have sufficient access to mainstream financial services and products that are typically offered by retail banks. They thus regularly rely on cash and cheques as a means of funding rather than bank-related methods such as credit cards or loans.

As can be seen in the discussion earlier, conventional finance has embraced fintech in a big way, particularly in all the areas of the fintech ecosystem, models and applications. Could the same be said about Islamic finance? To what extent has Islamic finance embraced the fintech revolution?

Islamic finance and fintech

The fintech revolution in Islam finance is yet to pick up pace to the extent that is being witnessed in the conventional ecosystem and business models. What can be seen are selective developments in a few Muslim countries and organisations. The counted "Islamic Fintech" firms and Muslim-friendly fintech solutions as at the time this chapter was completed are known to be 114 (IFN Fintech 2017).

At the top spot of these countries is Malaysia. Jayaseelan (2017) cites a few examples of fintech development in Malaysia in the areas of robo advisory, insurance and P2P lending, among others. In 2017, Malaysia's Securities Commission (SC) introduced guidelines for parties interested in applying for a license to operate robo advisory services in Malaysia. Robo advisory is software that brings investment advice to the masses in a cheap and efficient manner. In insurance, Jayaseelan (2017) reported that GetCover Sdn Bhd was soon going to launch GetCover, a free mobile application that would allow users to buy motor insurance directly from insurers, and the app was expected to be the first of its kind in the market. Meanwhile SMEs, according Jayaseelan (2017), would no longer have to rely solely on banks. Six technology-based P2P platforms, licensed to match investors with SMEs looking to raise debt, were going to be launched soon in Malaysia. All six would quickly seek to build their portfolio of borrowers.

Fintech and *maqāsid al-Sharī'ah*

There are a few studies that have investigated the relationship between Islamic finance and-*maqāsid al-Sharī'ah* in the areas of Islamic finance compliance (Mustafa and Syahidawati 2013), Corporate Social Responsibility (Dusuki 2005), performance measurements and indexes (Mustafa and Taib 2015; Shahwan et al. 2013) and stability of Islamic banks (Ismail and Che Pa 2015). There are hardly any studies on *maqāsid al-Sharī'ah* and fintech, apart from one (Achsien

and Purnamasari 2016). Though the paper is on crowdfunding, the authors mentioned in passing that Islamic finance must conform to *maqāsid al-Sharī'ah*. There is no serious deliberation relating this fintech business model to *maqāsid al-Sharī'ah*. Therefore, this chapter, to the best knowledge of the authors, is so far the only attempt to dedicate an in-depth study on *maqāsid al-Sharī'ah* and fintech.

The theory of maqāsid al-Sharī'ah

Muslim scholars from the time of the companions have been cognisant of the fact that the broad objectives of *maqāsid al-Sharī'ah* are to promote *maslahah* (public good or benefit) and to prevent *mafsadah* (hardship or harm). However, the concepts of *maslahah* and *mafsadah* were not fully conceptualised into theories until the time of al-Juwayni (d. 1085 CE). Al-Juwayni used the concept of *maslahah* and *mafsadah* to develop the first theory of *al-maqāsid*, although he confined his theory to legal matters such as the method of determining Sharī'ah principles and rulings. Al-Juwayni's theory was later refined by his student, al-Ghazali (d. 1111 CE). He categorised *maslahah* into three parts: necessities (*daruriyāt*), complements (*hājiyāt*) and embellishments (*tahsiniyāt*). According to al-Ghazali, necessities are those elements without which the system of a nation will run into chaos. Complements are elements that facilitate human lives. Meanwhile, embellishments are elements that are related to moral and ethical conducts. He further refined necessities into the preservation of five essentials (*daruriyyāt khams*), namely religion (*din*), life (*nafs*), intellect (*aql*), progeny (*nasl*) and wealth (*māl*). These five essential elements are given priority according to this order. The theoretical framework of al-Ghazali's *maqāsid* is illustrated in Figure 7.1.

Several subsequent works on *maqāsid* have largely benefitted from al-Ghazali's theory. These include works by Ibn Ashur (2006), Al-Shatibi (1997) and Abu Zahra (1997). For example, (Al-Shatibi 1997) expanded the application of al-Ghazali's three levels of *maslahah* and referred to them as universal concepts and their classifications as final (*qati'i*) (Nyazee 1994). Abu Zahra (1997) extended

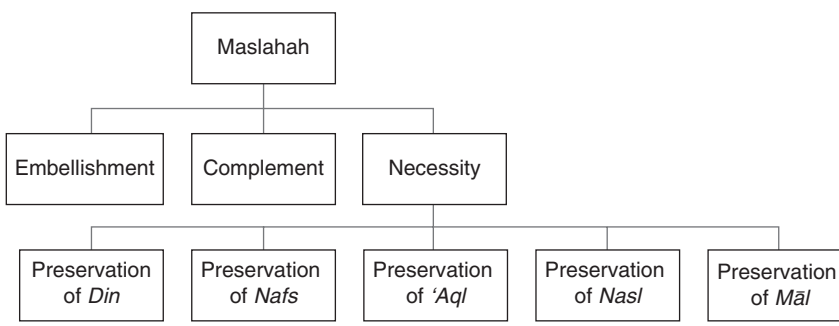

FIGURE 7.1 Al-Ghazali's theoretical framework of *maqāsid*.

al-Ghazali's theory to include justice and education. The present study has adopted al-Ghazali's theory of *maqāsid*, particularly the five essentials (*daruriyyāt khams*). Since fintech is being discussed in the context of finance, the study has only focused on one essential, preservation of *māl*, and has used it to develop a framework to evaluate the extent to which the present fintech ecosystem and business models in Islamic finance conform to *maqāsid*. To do this, the following methodological steps were taken. The study has: operationally defined the essentials of *māl*; derived the dimensions corresponding to the essential of *māl*; derived the corresponding elements for each dimension; and developed a framework for measuring fintech activities based on *maqāsid*.

The meanings and operational definition of māl

This subsection has surveyed Islamic primary sources (Qur'an and Sunnah), lexicon dictionaries, Quranic translation materials, commentaries of hadith and works of Muslim scholars related to *maqāsid al-Sharī'ah* to identify the various literal and technical definitions of *māl*. The results are then used to come up with the operational definition of *māl* for this study.

The meanings of the word *māl* in the Qur'an varies relative to the different contexts in which it is used. Wealth in essence is "*khayr*" or something good (Qur'an 2:215 and 2:272). Allah is the sole owner of *māl* (wealth) and people are entrusted as vicegerents (*khulafā*, singular *khalifah*) to utilise this wealth in a manner ordained by Allah (Qur'an 57:7). In another instance, *māl* is regarded as a test from Allah (Qur'an 6:165) for man. The test is manifest in his struggles to earn it and at the end of his achievements he is also tested as to whether he is grateful or ungrateful to these bounties (Qur'an 27:40). *Māl* can be used to achieve the highest level of virtue (Qur'an 2:261). The Qur'an reminds that *māl* entails responsibility and accountability (Qur'an 24:33, 57:7 and 4:6). In dealing with wealth, people are urged by the Qur'an to avoid negative elements such as hoarding, inequitable circulation of wealth and its concentration in a few hands (Qur'an 9:34–35). The Sunnah is another primary Sharī'ah source that has explained *māl* in detail, with meanings similar to those provided by the Qur'an. The Prophet (pbuh), in one of his traditions or hadith, prohibited people from wasting wealth/property.

From the viewpoint of Muslim scholars, *māl* in the Arabic language broadly implies anything valuable, which includes tangible and intangible properties. Al-Shatibi (1997) defined *māl* as: "Whatever is acquired legally, possessed, owned and the owner has exclusive authority to dispose the property". Another scholar (Al-Suyuti 1997), citing al-Shafi'i, considers wealth as "something valuable that can be exchanged and compensated for if damaged". Meanwhile, Muslim scholars of *maqāsid al-Sharī'ah* define *māl* largely in terms of its functions and preservation. Some scholars, for instance, Auda (2008), propose a contextual shift in the use of the terminologies; from al-Juwayni's "protection" and later al-Ghazali's "preservation" to "development" and, therefore, focus should be on the development of *māl* rather than its preservation. Wealth must be in circulation (*rawāj*), transferable

as financial rights (*huquq māliyyah*), transparent (*wuduh*) in business dealings, capable of being preserved (*hifz*) and free from corruption and misuse, durable (*thabat*) and ensure fairness (*adl*) (Ibn Ashur 2006). According to Ibn Ashur (2006), preservation of property denotes protecting the wealth of the community from destruction and misappropriation by others without counter values or compensation. Al-Raysuni (2006) cited al-Juwayni and al-Ghazali who regarded the preservation of *māl* as its protection from thieves through severe punishments, and al-Shatibi is of the view that preservation of *māl* is safeguarding it against injustice, deprivation of orphans, extravagance, envy, deceit in weight and measures and corruption (Al-Raysuni 2006). Contemporary Muslim scholars – for example, Hassan and Mahlknecht (2011), Ka (2008), Dusuki and Bouheraoua (2011) and Chapra (2008) – have expanded on the definition of *māl*, particularly its preservation to include protection of ownership rights, acquisition and development of property, investment, growth, transparency, justice and circulation.

All discussions of *māl* in these Islamic sources did not yield any operational definition. This could probably be due to the following reasons. First, the Qur'an and Sunnah normally provide concepts, principles, injunctions and facts of life related to the subject matter. Second, the scholars of *maqāsid* in the past did not see the need for providing operational definitions to *māl*, including the other four necessities, because their intended audiences at that time were scholars in the same area who were familiar with the concepts of the five essentials of *maqāsid* (Al-Raysuni 2006). Third, over the years many scholars have been more interested in extending al-Ghazali's *maqāsid* theory to different areas within their socio-economic context. Some of these scholars are Al-Shatibi (1997), Ibn Ashur (2006), Abu Zahra (1997), Afr (1991), Chapra (2008), Attia (2008), Auda (2008), Dusuki and Mokhtar (2010) and Larbani and Mohammed (2011). These works have hardly provided the operational definitions of the five *maqāsid* elements including *māl*. Nevertheless, recently there has been an attempt by Selamah et al. (2015) to provide the operational definitions of the five *maqāsid* essentials. We reproduce hereby their operational definition related to the preservation of *māl*:

> *Hifz al-Māl*: it refers to all resources which Allah made subservient to man and can be defined as anything (property) that can be owned and has value, including the rights and benefits of ownership based on the concept of *khilafah* (stewardship), which entails accountability with the objective to restore *Adl* (socioeconomic justice) and promote *Ihsan* (mutual benevolence).
>
> *(p. 167)*

Based on the earlier discussion relating to the meaning and operational definition of developing *māl*, the authors provide the following operational definition: *māl*, whether physical, usufruct or service, can be developed through proper earnings and spending, and the means and outcome of developing *māl* must conform to *maqāsid al-Sharī'ah*.

Deriving the dimensions corresponding to the essential of māl

Based on Sekaran's (2000) behavioural science method, concepts like the essential of *māl* can be operationalised into dimensions and the corresponding elements. Figure 7.2 illustrates Sekaran's (2000) method.

Sekaran's method breaks down abstract notions or concepts (C) into observable characteristic behaviours, which she termed as dimensions (D). The dimensions are then further broken down into measurable behaviours that she referred to as elements (E). She cited the example of thirst as a concept. The behaviour of thirsty people is to drink a lot of fluid (Dimension). The degree of thirst can be measured by the number of glasses drunk by each thirsty individual (Element). Both past and contemporary Muslim scholars have discussed the dimensions of the essential of *māl*.

The Sharī'ah views wealth as an indispensable source of livelihood, development and the building of civilisations. Therefore, the Sharī'ah has provided value proposition and a mechanism for dealing with financial transactions in a manner that directly affects the lives of people and brings about positive results for achieving public interests or *maslahah*. Furthermore, the Sharī'ah has made wealth one of the five essentials: religion, life, intellect, progeny and wealth that must be preserved as well as sustaining its existence. To achieve the primary objective of this chapter, this section has discussed the various dimensions of the essential of *māl* in the literature, which can be categorised into three: Sharī'ah value proposition, development of *māl* and socio-economic welfare. The first and third dimensions are the objectives, while the second dimension, development of *māl*, is the means to achieve the two dimensions.

The Sharī'ah value proposition

Maqāsid scholars have discussed values that the Sharī'ah has proposed when dealing with the essential of *māl*. These values include upholding the principle of justice as opposed to injustice, avoidance of wastage, extravagance, hoarding, theft

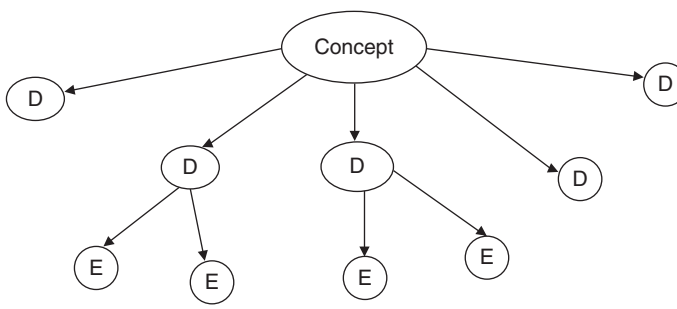

FIGURE 7.2 Sekaran's operationalisation method.

Source: Adopted from Sekaran, 2000
Note: D denotes Dimensions and E, Elements

and misappropriation to ensure efficiency in wealth utilisation; and to ensure wealth circulation, trust and transparency in business activities. According to Al-Ghazali (1971), the Qur'an prohibits the consumption of the wealth of others unjustly: "O you who have believed, do not consume one another's wealth unjustly" (3: 29), and, in another chapter of the Qur'an :"Indeed, those who devour the property of orphans unjustly are only consuming into their bellies fire. And they will be burned in a blaze" (3:10). Also, Qur'an 2: 278 states: "O you who have believed, fear Allah and give up what remains [due to you] of interest, if you should be believers." Unjust consumption of others' wealth, dealing in usury, usurping the wealth of the orphans, price-hiking and sales by a city dweller on behalf of a Bedouin who is unfamiliar with the price levels (taking advantage of information asymmetry) are all prohibited in Islam (Al-Ghazali 2004). In another Quranic verse it is stated that: "O you who have believed, do not consume one another's wealth unjustly but only [in lawful] business by mutual consent. And do not kill yourselves [or one another]" (4:29), and, based on the Prophet's sayings: "No doubt, your blood and your properties are sacred to one another like the sanctity of this day of yours, in this month [Dhu al-hijjah] of yours, in this town [Makkah] of yours". Ibn Ashur (2006) pointed that "it is the duty of the community's rulers and those in charge of its public interests to pay special attention to the protection of public wealth, whether this wealth is exchanged with other nations or kept in the hands of the community".

Another value proposition is the avoidance of wasting wealth and extravagance because this results in loss of benefits of the people. Waste and extravagance are prohibited in the various verses of the Qur'an. For example: "and do not spend wastefully. Indeed, the wasteful are brothers of the devils, and ever has Satan been to his Lord ungrateful." (17: 26, 27). Al-Ghazali (1971) defines extravagance as spending wealth on forbidden activities or/and spending in excess on permissible activities. Al-Ghazali (1971) provides several examples of extravagance: excessive spending on food, the construction of buildings, and waste of wealth and money can be in the form of burning and shredding clothes, demolition of the building, throwing money in the sea and all forms of corruption. Al-Ghazali was also of the view that extravagance is subjective and varies according to the people and their situations: if a man has only 100 dinars for his basic needs necessary for the maintenance of his family members, spending it on a second marriage will be considered as extravagance. Similarly, a person with a big family who is unable to make ends meet is not allowed to spend his money for decorating his house, as it is extravagance. This is unlike a rich person who is allowed to decorate his house and spend his money freely on clothes and food, etc., within the required Sharī'ah limit. The same view is also held by Al-Shatibi (1997).

Islam prohibits hoarding of wealth, as it does not help to achieve the Sharī'ah objective of wealth, which should circulate to spur business activities. Those who hoard, commit sin and are punishable by God: "And those who hoard gold and silver and spend it not in the way of Allah – give them tidings of a

painful punishment" (Qur'an 9:34). Those who commit theft are also punishable. According to Al-Ghazali (1971), a thief is punished because his act violates the rights of others. Thus, the Sharī'ah has prohibited extravagance, waste, hoarding and theft in addition to monopoly and gambling to achieve the objective of income and wealth circulation.

The *maqāsid* scholars have discussed wealth circulation through production or investment, consumption and distribution. Ibn Ashur (2006) stated that: "wealth distribution is fair if it circulates in the hands of as many people as possible". Ibn Ashur provides numerous textual proofs which oblige people to circulate wealth and invest it to ensure growth. For example, At-Tirmidhi (n.d.) narrated the Prophet (pbuh) saying: "If anyone is a guardian of an orphan who owns property, he must trade with it and not leave it till the sadaqah (zakat) consumes it". This is an explicit command for people to circulate money and invest it and not to keep it idle for a lunar calendar year lest it be consumed by *zakat*, which will become due at the end of the year. In addition, Allah says:

> And what Allah restored to His Messenger from the people of the towns – it is for Allah and for the Messenger and for [his] near relatives and orphans and the [stranded] traveller. so that it (wealth) does not circulate among the rich from amongst you.
>
> *(Qur'an 59:7)*

The Sharī'ah also encourages transparency through proper documentation, presence of witnesses and pledge or guarantee. Ibn Ashur (2006) stated that, "the condition for transparency in dealing with wealth is to prevent harm and disputes as much as possible among contracting parties. For this reason, pledges and documentation have been prescribed". Ibn Ashur further stated that:

> Documentation is required primarily to protect the owners of properties from all kinds of risk and dispute. The owner, whether an individual or a group, should have the exclusive right to what has been earned lawfully so that this right is not subject to any kind of delay or risk.

That is why rules governing the validity and validation of contracts and the fulfilment of stipulations have been instituted. The same can be said regarding the Sharī'ah objective for earning (*iktisab*), and the property owner should be free to dispose of what is owned or earned in such a way as not to cause considerable harm to others or violate the rules of the Sharī'ah.

Justice is another important component of Sharī'ah value proposition. It applies to the means of acquiring and disposing of wealth. Ibn Ashur (2006) stated that: "Justice means that wealth and property must not have been acquired wrongfully and unjustly. That is to say, it must have been acquired by personal effort by compensation given to the original owner, by donation, or by inheritance".

Development of al-māl

Māl can be developed through production or investment. For this, it must be properly earned and spent. There are numerous textual proofs in the Qur'an and the Prophet's tradition urging people to earn and produce wealth. For example, the Qur'an emphasises travel for earnings: "It is He who made the earth tame for you – so walk among its slopes and eat of His provision – and to Him is the resurrection" (67:15). And in the following verse: "He has known that there will be among you those who are ill and others travelling throughout the land seeking [something] of the bounty of Allah" (Qur'an 73:20). Ibn Ashur (2006) mentioned that: "Earning (*takassub*) consists of exerting oneself to gain what would help to satisfy one's needs, whether by physical labour or by mutual consent with others. It depends on three primary factors: land, labour, and financial capital". Al-Ghazali (2004), discussing the merits of earning livelihood, stated that trade is one of the most important means of earning, and he concluded that it is a collective obligation (*fard kifayah*), like trade, commerce and industry, that if the various types of trade and industry are given up, it will be difficult for people to manage their livelihood and the majority of the people would be destroyed. People should diversify their responsibilities in various kinds of work. If all remain busy in only one kind of work, all other works would remain idle and hence people would be destroyed.

Socio-economic welfare

Earnings and spending at micro and macro levels must be directed towards socio-economic welfare of the entire ecosystem. As the lawgiver has identified the sources of earning wealth, He has also identified its method of expenditure. The rational expenditure is what God has encouraged to be spent in the most important benefits. Al-Ghazali (2004) has identified the kinds of benefits that accrue from earnings and spending wealth. (1) The benefit of earning and spending for divine service. It means wealth is spent for rituals, such as expenses for performing pilgrimage. A poor man is deprived of these benefits. However, the poor can spend for other rituals whose performance requires strength and thus in turn requires spending on food, dress, abode and other necessities of life. This spending is up to the limit of necessity. (2) Benefits that accrue from spending for good works, which are of four kinds: (a) charity – through this expense, brotherhood and friendship are established and the attribute of generosity is born; (b) gracious spending for recreation, entertainments, feeding others, giving presents, helping others and expense for giving satisfaction to others; (c) expense for preserving honour; and (d) to pay remuneration for works.

A contemporary scholar, Chapra (2008), stresses the importance of promoting equitable distribution of income and wealth in the development of and expansion of wealth. He provides the following suggestions to achieve this purpose: redistributive methods of *zakah*, *sadaqat* and *awqaf*, economic development to increase

national income, strengthening of human resources – education, technological advancement, work ethics, etc. – proper monetary and fiscal policies to accelerate development, access to capital for the poor – microfinance and employment and self-employment opportunities – vocational training, etc. He also states that the development and expansion of wealth can be realised through education, research and improvement in technology and management, security of life, property and honour, good governance, freedom of enterprise and employment and self-employment opportunities. Chapra's views can also be categorised into three: Sharī'ah value proposition, for example, equitable distribution and freedom of enterprise; development of *māl*, for instance, economic development to increase national income and technological advancement; and socio-economic welfare, such as redistributive methods of *zakah*, *sadaqat* and *awqaf* (Chapra 2008). Table 7.1 presents the three dimensions derived from the essential of *māl*.

As earlier discussed, the objectives of Sharī'ah are to achieve *maslahah*, which is categorised into three levels and this study focuses on the first level of necessity or *daruriyyāt* (first column on the left) of Table 7.1. *Daruriyyāt* are meant to preserve five essentials and the present study is based on the preservation of wealth or *hifz al-māl* (second column on the left). The three dimensions corresponding to the *hifz al-māl* are: development of *māl*, which is the means to achieve the other two dimensions, Sharī'ah value proposition and socio-economic welfare (third column on the left).

Developing the fintech maqāsid *framework*

Figure 7.3 provides the theoretical framework of the Fintech Maqāsid Framework (FMF) that can be used to measure the fintech business activities in Islamic finance.

TABLE 7.1 The dimensions of the essential of *Māl*

Essentials of daruriyyāt	*Dimension [means]*	*Dimension [objectives]*
Hifz al-Māl	Development of *māl*: Al-Qur'an • Al-Sunnah • (Al-Ghazali 2004) • (Ibn Ashur 2006)	Sharī'ah value proposition • Al-Qur'an • Al-Sunnah • (Al-Ghazali 1971) • (Al-Ghazali 2004) • (Ibn Ashur 2006) • (Al-Shatibi 1997) Socio-economic welfare • Al-Qur'an • (Al-Ghazali 2004) • (Chapra 2008)

FIGURE 7.3 Fintech *maqāsid* framework (FMF).

The elements of the essential of māl

In the previous section, this study surveyed the literature to identify sources that have materials with concepts related to the dimensions of the essential of *māl*. Sekaran (2000) and content analysis were used to operationalise the *maqāsid* concepts related to the essential of *māl* to three respective dimensions: Sharī'ah value proposition, development of *māl* and socio-economic welfare. The present section has translated these three dimensions into fintech elements and proposes indicators corresponding to these elements.

The first dimension is the *Sharī'ah value proposition*. The elements of this dimension are derived from the fintech ecosystem and business model. It is assumed that these fintech elements will be Sharī'ah compliant and they will impart values that conform to Sharī'ah value proposition. Based on the discussion on fintech literature, and based on the section that discussed the fintech ecosystem, business models and applications, the fintech elements for this dimension are the values that emanate from fintech business activities. According to Tapscott and Tapscott (2016) and Pazaitis et al. (2017), these values are trust, honesty, accountability, and consideration. This is in addition to justice, transparency, wealth circulation, avoidance of wastage, extravagance, hoarding, theft and misappropriation discussed by *maqāsid* scholars.

The second dimension is *development of māl*. The elements of this dimension are also derived from the fintech ecosystem and business model. These fintech elements contribute to the development of wealth in the various forms of business activities. Based on the discussion on fintech literature and based on the section that discussed the fintech ecosystem, business models and applications, the fintech elements for this dimension are derived from the works of Lee and Shin (2018), Tapscott and Tapscott (2016), Frankenfield (2018), Bergstra (2015), Schueffel (2017) and Haycock and Richmond (2015), who have identified the following elements: payment, wealth management, lending, crowdfunding, capital market, insurance, robo-advisory, big-data analytics, cloud computing, cryptocurrency, social media, blockchain, Insurtech, Sandbox, smart contract, employment opportunities and changes in consumer lifestyles.

The third dimension is *socio-economic welfare*. The elements of this dimension are derived from the works of Pazaitis et al. (2017) on social co-sharing.

TABLE 7.2 The relationships between the dimensions and elements of the essential of *Māl*

Essentials of daruriyyāt	*Dimensions*	*Elements*	*Sources*
Hifz al-Māl	(1) Sharī'ah value proposition	Trust	(Tapscott and Tapscott 2016)
		Honesty	
		Accountability	(Pazaitis et al. 2017)
		Consideration	(Al-Ghazali 1971)
		Fairness	(Al-Ghazali 2004)
		Transparency	(Ibn Ashur 2006)
		Wealth circulation	(Al-Shatibi 1997)
		Avoidance of wastage	
		Avoidance of extravagance	
		Avoidance of hoarding	
		Avoidance of theft	
		Avoidance of misappropriation	
		Avoidance of corruption	
	(2) Development of *māl*	Payment	(Lee and Shin, 2018)
		Wealth management	(Pazaitis et al. 2017)
		Lending	(Haycock and Richmond, 2015).
		Crowd funding	
		Capital market	(Pazaitis et al. 2017)
		Insurance	(*Insurtech*, n.d.)
		Robo-advisory	(Bergstra, 2015)
		Big data analytics	(Schueffel 2017)
		Cloud computing	
		Cryptocurrency	
		Social media	
		Blockchain	
		Employment	
		Consumer behaviour	
		Insurtech	
		Sandbox	
		Smart contract	
	(3) Socio-economic welfare	Generosity	(Al-Ghazali 2004)
		Charity	(Chapra 2008).
		Wealth redistribution	(Pazaitis et al. 2017)
		Social sharing	

This is in addition to the elements of generosity and charity from the works of Al-Ghazali (2004) and the element of wealth redistribution from Chapra (2008). Table 7.2 shows the relationships between the three dimensions and their corresponding elements.

As discussed earlier, the dimension of the *development of māl* is the means to achieve the other two dimensions: *Sharī'ah value proposition* and *socio-economic*

TABLE 7.3 The relationships between the elements of the essential of *Māl*

Essentials of daruriyyāt	*Elements of developing* māl *[means]*	*Elements of Sharī'ah value proposition & socio-economic welfare [objectives]*
Hifz al-Māl	Payment	Trust
	Wealth management	Honesty
	Lending	Accountability
	Crowd funding	Consideration
	Capital market	Fairness
	Insurance	Transparency
	Robo-advisory	Wealth circulation
	Big data analytics	Avoidance of wastage
	Cloud computing	Avoidance of extravagance
	Cryptocurrency	Avoidance of hoarding
	Social media	Avoidance of theft
	Blockchain	Avoidance of misappropriation
	Employment	Avoidance of corruption
	Consumer behaviour	Generosity
	Insurtech,	Charity
	Sandbox	Wealth redistribution
	Smart contract	Social-sharing

welfare. Hence, the corresponding elements will also follow suit. They are categorised into means and objectives. Table 7.3 depicts these relationships.

From Table 7.3, the elements of the dimension of developing *māl* are means to achieve the elements of the dimensions of *Sharī'ah value proposition* and *socio-economic welfare*. For example, the elements of payment, crowdfunding, robo-advisory, etc., must achieve trust, accountability, fairness, etc. This can only be determined by identifying suitable indicators. Table 7.4 proposes some of these indicators.

Conclusion

This chapter has demonstrated that it is possible to develop a framework based on *maqāsid al-Sharī'ah* for measuring the fintech business activities in Islamic finance. The chapter has surveyed the *maqāsid* literature to come up with an operational definition and thereafter identify in the context of fintech the relevant dimensions and corresponding elements for developing the framework. Three dimensions were identified: *development of Māl*, *Sharī'ah value proposition* and *socio-economic welfare*. The dimension of the *development of al-Māl* is the means to achieve the other two dimensions, *Sharī'ah value proposition* and *socio-economic welfare*. The corresponding elements were also derived from discussion on fintech ecosystem and business models. The study has suggested a few indicators to

TABLE 7.4 The relationships between the dimensions, elements and proposed indicators of the essential of *Māl*

Essentials of daruriyyāt	*Elements of developing* māl *[means]*	*Elements of Sharī'ah value proposition & socio-economic welfare [objectives]*	*Proposed indicators*
Hifz al-Māl	Payment	Trust	
	Wealth management	Honesty	
	Lending	Accountability	
	Crowd funding	Consideration	
	Capital market	Fairness	
	Insurance	Transparency	World transparency index
	Robo-advisory	Wealth circulation	Gini coefficient
	Big data analytics	Avoidance of wastage	
	Cloud computing	Avoidance of extravagance	
	Cryptocurrency	Avoidance of hoarding	
	Social media	Avoidance of theft	
	Blockchain	Avoidance of misappropriation	
	Employment	Avoidance of corruption	World transparency index
	Consumer behaviour	Generosity	Giving index
	Insurtech	Charity	
	Sandbox	Wealth redistribution	
	Smart contract	Social-sharing	

measure the elements. Future research could build on the current work and identify more robust indicators for measuring fintech business activities in Islamic finance based on *maqāsid al-Sharī'ah*.

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8

FINTECH AND ISLAMIC FINANCE

Setting the Sharī'ah parameters

Mohamad Akram Laldin and Hafas Furqani

Introduction

Fintech is a new way of finance by providing innovative products that would improve existing practices and facilitate consumers' experiences in transactions in an efficient and effective way. The application of fintech in Islamic finance is a welcome development but such fintech solutions must observe the principles and rules of the Sharī'ah. In principle, Sharī'ah allows any innovation in financial practices provided the practices observe the prohibitions such as interest (*riba*), gambling (*maysir*), uncertainty (*gharar*), harm (*darar*), cheating (*tadlis*), etc. Such solutions should also observe the rules in contract under the Sharī'ah, namely the pillars (*rukn*) and conditions (*shurut*). Above all, the fintech solutions should observe Islamic ethics in transactions, and aim at achieving the objectives of Sharī'ah.

This chapter aims at elaborating on the Shariah parameters for fintech solutions in Islamic finance. To achieve this objective, three major dimensions are taken into consideration, namely fintech and innovation in Islamic finance, Sharī'ah compliance and *maqāṣid al-Shariah* (objectives of Sharī'ah) realisation in fintech application.

Sharī'ah and financial innovation

Finance is one of the important aspects in human life that help in fulfilling various needs as well as in enhancing the quality of life. Finance assists economic development by allocating funds within society from those who have extra funds to those who need the funds to fulfill their needs. In line with human progress and technological advancement, financial practices have evolved from simple transactions into complicated and sophisticated arrangements. Throughout the

history of mankind, financial innovations have attempted to assist human beings in their financial arrangement in an efficient and effective way. Financial innovations involve all aspects, from the design, development and implementation of innovative financial instruments and processes and the formulation of creative solutions to problems in finance (World Economic Forum, 2012).

Fintech is a new way in providing financial services. Fintech offers product innovation by structuring financial products that are new or significantly improved and enhanced with respect to their characteristics or intended uses. Hence, fintech is simply defined as the application of technology within the financial industry in a more friendly and efficient manner. Lately, the term fintech has been popularised in the financial industry and the widespread adoption of fintech in the industry covers a wide range of activities including financing, payments, operation and risk management, data security and monetisation and customer interface as well as other related areas.

Fintech has been adopted in the Islamic finance industry as a new way in delivering core Islamic finance solutions. Islamic law holds a principle that the basic rule in business transactions (*mu'amalah*) is permissibility (*ibahah*), except when there is a clear text which prohibits it. The permissibility principle provides a flexible room for innovation and new practices in business and financial transactions. All innovations in *mu'amalah* are considered permissible and are generally encouraged. Innovations only become impermissible if there is clear evidence that there is conflict with the fixed (*thawabit*) rules of Sharī'ah.

Sharī'ah is also very rich with the resources and methods that would encourage innovations in financial practices and guide them in proper direction, such as *usul al-fiqh* (the study and critical analysis of the origins, principles and sources of Islamic jurisprudence), *qawa'id al-fiqhiyyah* (the study of legal maxims that are used in Islamic law), *'ilm tarikh tashri'* (the study of the history of Islamic legislation), *falsafah al-tashri'* (the study of the philosophy of Islamic law and its legislation) and *'ilm maqāṣid al-Shari'ah* (the study of the meaning and objectives of Sharī'ah), which recently gained interest among scholars to respond to the changes and development in human civilisation.

Therefore, Islamic finance should be proactive rather than reactive to financial innovations. In the past four decades, the Islamic finance industry has been more reactive by following the advance development of conventional finance practices and simply adopting such market practices with some modification. Though not inherently wrong, the approach to replicate the conventional products in a Sharī'ah-compliance mould has been extensively done in structuring Sharī'ah-compliance products. The approach is described by Saeed (2004: 114) as pragmatic, whereby the concern is in innovating Sharī'ah-compliant product structure by changing the conventional product structure to follow the criteria and principles of the Sharī'ah.

The replication of conventional financial products and structures is done by adjusting the interpretation of financial principles in Islamic law to accommodate and provide the same types of services and investment mechanisms as the

dominant conventional financial system based on the needs of society. In practice, the approach is done in three general steps, namely, the negative screening of prohibited elements in conventional structure, applying Islamic principles/contracts in different types of conventional finance and adding new features based on Sharī'ah contracts. In the adaptation approach, *hiyal* (legalistic trickery to find justifiable ways of Islamic law application) and *makharij* (finding solutions for application of Islamic law) are necessary within certain Sharī'ah parameters and in fact are inevitable to a successful adaptation of conventional finance products (Laldin and Furqani, 2016).

Nevertheless, Sharī'ah contracts utilised in Islamic finance should not be restricted to the replication approach to suit the features of conventional finance products. Innovation through fintech should be explored to emphasis the value proposition of Islamic finance such as how to use technology to ensure minimal risk in the *musharakah* and *mudarabah* models of financing or how *istisna'a* and *salam* can be operated and optimised using fintech. In other words, fintech should open a new chapter in Isalmic financial products and services whereby the industry can witness the application of various Sharī'ah contracts using fintech solutions to facilitate the needs of society.

While we cannot ensure the elimination of *hiyal*, *makharij* and *dhara'i* (the legal principle of blocking the means to evil) in dealing with fintech, it is important to note that the emergence of fintech should trigger innovations among the Islamic finance industry players and promote creativity by providing new perspectives and practices in financial transactions. Sharī'ah scholars and industry players in this regard must work together to produce innovative Sharī'ah-compliant products that fulfil the needs of society and help in realising the objectives of Shariah (*maqāṣid al-Sharī'ah*).

Fintech and Sharī'ah compliance

From the Sharī'ah point of view, the adoption of any supporting services or solutions in Islamic finance is very much encouraged and is within the permissible areas of development in Islam. Sharī'ah compliance in fintech solutions is similar to traditional Islamic finance. Fintech solutions should be guided by the broad principles of Sharī'ah by avoiding the prohibited elements in transactions, such as interest, gambling, uncertainty, harms, cheating, etc.

On the question of change in technology as offered in fintech, it should be noted that changes in technology shall accommodate the fixed principles of Sharī'ah (which are very few and mainly the prohibitions mentioned earlier). As for the other rules which can change with the change of time and place as well as technology, Sharī'ah can accommodate such rules. In order to ensure proper Sharī'ah compliance, there should be a synergy between IT and finance experts and Sharī'ah scholars in the product development process.

In addition, as earlier mentioned, transactions carried out using fintech solutions should also follow the rules of contract (*'aqd*) under the Sharī'ah by

observing the pillars (*rukn*) and conditions (*shurut*) in the contract. Besides, fintech solutions should observe Islamic ethics such as transparency, fairness and justice, and avoid cheating, fraud, misrepresentation and other actions that would create mistrust and unhappiness among the users (Kamali, 2012). These values would not only protect customers and the public at large, they would also promote the smooth allocation of resources and fair dealings in transactions that Islamic law aims to achieve. According to Abtani (2007),

> Islamic law cannot be separated from its moral, ethical and religious principles; otherwise, its rules will be useless. In other words, the Islamic system cannot be secular. This is because all Islamic rules, including economic and political, are connected with the faith, beliefs and worship of Islam.

In addition, fintech solutions should also aim at achieving the objectives of Sharī'ah (*maqāṣid al-Shariah*), namely to realise the benefits (*maṣlaḥah*) and avoide the harms or difficulties (*mafsadah* and *mashaqqah*) in the transactions.

As in traditional Islamic finance, fintech practices should also be supervised to ensure the operations are Sharī'ah compliant. Nevertheless, the existing Sharī'ah governance framework in most jurisdictions has not recognised the existence of fintech and how to supervise its Sharī'ah compliance. Moving forward, the issue of Sharī'ah compliance in fintech operations and practices should be taken into consideration by regulators or supervisory authorities so that Muslim consumers do not remain sceptical about such innovations. This will also help to boost the confidence of potential investors in embracing such technologically enabled financial intermediation. A proper Sharī'ah governance framework would also ensure the operation of fintech is in total compliance with Sharī'ah, minimise Sharī'ah non-compliance risk in firms who utilise fintech and minimise related disputes (Laldin, 2017).

In certain situations where there are shared services between the Islamic and conventional financial institutions, fintech should be developed to enforce the purpose of the transactions as envisaged by the Sharī'ah. For example, in the structuring of a fintech-enabled transaction related to *ijarah* (lease contract), the system should be able to define the ownership of the underlying assests of *ijarah*, where the lessor owns the asset and the lessee owns the usufruct of the asset. Similarly in a *murabahah* transaction, all the parties involved, transfer of ownership and price and the sequence of the transactions must be captured so as to avoid any inconsistencies with the requirements of Sharī'ah.

There are several services which can be similar between the conventional and Islamic entities of a financial institution. For example, in facilitating the transfer of cash between parties using internet banking, if A wishes to make a payment for purchasing a certain commodity from B using e-transfer or online mode there is no difference between Islamic and conventional, as both can use the same system and method of transfer, as the end result is that the amount that A intends to pay to B will be debited from his account and credited into B's account

to complete the transaction. As mentioned earlier, the general rule of Sharī'ah regarding transactions shall be observed and technology can facilitate such mode of payment.

It should be noted that the "Sharī'ah compliance" title carries the expectation of a financial system and practices that are truly based on all the tenets of the Sharī'ah, namely, faith (*aqīdah*), Islamic legal principles (*ahkām shar'iyyah*) and ethics *(akhlāq)*, and that they serve the noble goals prescribed by Islam (*maqāṣid al-Shariah*) (Furqani, 2013).

Fintech and *maqasid al-Sharī'ah* realisation

Fintech, for players in the financial sector, will result in a shorter transaction chain, reduced operational cost, enhanced resilience of operational processes, the ability to access new customer segments to increase revenue and improved capital efficiency. Fintech enhances consumer value proposition as fintech innovations promise to reduce the transaction cost, increase the available choices, improve the transaction speed and empower the customers by moving control over conducting a financial transaction from the financial institution to the customer. Fintech innovations and high penetration of mobile technology promise to enhance financial inclusiveness by bringing in a large segment of society. All these benefits can be considered as *maṣlaḥah* to the customer and other stakeholders in the whole practice of financial operations.

Sharī'ah itself aims at establishing *maṣlaḥah* that would contribute to the well-being of mankind, and *maqāṣid al-Sharī'ah* are basically related to human interest by providing for a good order of life and wellbeing (*maṣlaḥah*). Fintech, in this regard, is viewed as innovation in financial practice that would facilitate transactions in a convenient way and hence would contribute to the overall wellbeing (*maṣlaḥah*) of society. In this regard Allah (SWT) said:

> Allah intends every facility for you; He does not want to put you to difficulties.
>
> *(Qur'an, 2:185)*

In other word, fintech is welcomed so long as it brings real benefit to human beings and removes hardship in financial transactions. The Islamic legal maxim (*qawa'id al-fiqhiyyah*) in this regard says "hardship begets facility". Likewise, Sharī'ah also promotes fintech so long as it is developed with the noble intention of facilitating transactions and not for cheating or manipulating others. This is based on the Islamic legal maxim which says "matters are determined according to their intentions".

As the Sharī'ah is designed on the basis, and for the purpose, of *maslahah*, *maqāṣid al-Sharī'ah* constitute the various dimensions of human needs, and their fulfilment will create balanced satisfaction in human life at the level of both the individual and society and help realise overall human wellbeing. Therefore,

maqāṣid would encompass the micro and macro dimensions of individual and societal life. With reference to Islamic finance in particular, *maqāṣid al-Sharī'ah* refer to the overall goals and meaning that the Sharī'ah aims to achieve from its principles and rulings related to financial activities and transactions (Laldin, 2008: 77).

Fintech transactions must be transparent, with no hidden costs and irresponsible finance, and devoid of cheating and fraud, etc. These controls allow for the execution of an ethical transaction to really ensure that the goal of realising *maṣlaḥah* (benefits) and avoiding harms (*mafsadah*) is achieved. Therefore, there should be in place a regulatory framework to address consumer protection and market conduct issues as well as the technological impact on the orderly functioning of financial markets that promotes *maṣlaḥah* to the general public as desired by Sharī'ah. A fintech firm that operates within the framework must also commit to observe reasonable standards of service, transparency to customers, appropriate funding and reporting and disclosure requirements.

Likewise, fintech in Islamic finance is also expected to broaden and deepen the financial market by reaching out to the marginalised segment of society. Financial exclusion can be resolved if the financial institutions consider the poor and the weak in society as potential partners to grow and develop together. In a debt-based system, this segment of society will always be marginalised due to the high risk of default, as they have no collateral and a weak ability to settle the debt. Fintech application in Islamic finance is expected to bring new hope to this segment of society to nurture, empower and grow together.

Furthermore, risk-sharing financing instruments for small and medium enterprises (SMEs) and micro-insurance can be offered to solve the problem of the availability of credit, mobilisation of savings, insurance and risk management of the marginalised segments of society. Islamic finance should be concerned with this sector, not only because the private sector or conventional finance may not be willing to provide financing to some areas due to the high cost associated with credit assessment, credit monitoring and the lack of acceptable collateral, but because it is an approach of eradicating poverty, to build a healthy and vibrant economy and as a means to circulate wealth smoothly among a number of different groups in society as emphasised in the concept of *maqāṣid al-Sharī'ah*. The Qur'an also in this regard said, "so that wealth is not circulated among the rich in the society only" (Qur'an, 59: 7). Fintech application in this regard is expected to provide the much-desired solution by seamlessly connecting the surplus sector in society with the deficit sector; and hence, assistance, cooperation, and mutual help and empowerment could be given for mutual profit and prosperity as desired by the Sharī'ah.

Conclusion

Fintech, as a new innovation in financial services, is a welcome development in Islamic finance. The emergence of fintech should be used by Islamic finance

industry players as a new means for innovation by developing products and services that will benefit society and promote economic development. The expectation is not merely in offering financial products that are Sharī'ah compliant by using conventional structures, but also in the ability to offer financial products that are distinct, coming up from Islamic teachings, worldview and principles.

In the application of fintech in Islamic finance the following Sharī'ah parameters need to be observed, namely (1) financial and technological innovations are welcomed since under the Sharī'ah, the basic principle is permissibility (*ibahah*) and Islam encourages innovation in financial services to facilitate mankind's activities in transactions; (2) fintech application should observe the prohibitions such as interest (*riba*), gambling (*maysir*), uncertainty (*gharar*), harm (*darar*), cheating (*tadlis*), etc.; (3) fintech application should observe the rules in contract, namely the pillars (*rukn*) and conditions (*shurut*); (4) fintech application should observe Islamic ethics in transactions; and (5) fintech application should aim at realising benefits (*maslahah*) and avoiding harms *(mafsadah*) in society.

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9

CURRENCY IN ISLAMIC LAW

A Sharī'ah analysis of bitcoin

Mufti Faraz Adam and Mufti Abdul Kadir Barkatulla

Introduction

The last decade witnessed many events and developments in the financial world, such as the global financial crisis, the economic reforms in China, the slump in oil prices and the global drift towards a cashless economy. The digitisation of the economy, which led to innovative payment methods, revolutionised the concept of financial intermediation, further contributing to the evolution of money and currency.

Historically, as earlier as 9000 BC, nations would barter goods they had in surplus for goods they needed. Grains and cattle were popular goods of barter. In 1200 BC, cowries – the shells of a mollusc – were used as money in China (Wray, 2012). Thereafter, bronze and cooper cowrie imitations – considered to be the earliest form of metal coins – were manufactured in China at the end of the Stone Age in 1000 BC (Davies, 2002). Metal tool money, such as knives and spades, were also used in China. The first official currency was minted by King Alyattes of Lydia in modern day Turkey in 600 BC (Luo, 1999). Coins were developed out of lumps of silver and took the familiar circular form. This technique was duplicated and refined by the Greek, Persian, Macedonian and later the Roman empires. These empires used precious metals such as gold, silver and bronze whilst China used base metals (Luo, 1999).

In 118 BC, the first documented type of banknotes came into existence in China, where leather money was being circulated in the form of one-foot-square pieces of white deerskin with colourful borders. From the ninth to the fifteenth century, China experienced the rapid growth of paper banknotes in circulation to the point that their value rapidly depreciated and inflation soared. In 1816, gold was officially made the standard of value in England. Although banknotes were in use prior to this, this was the first time that their worth had been tied

directly to gold. In 1860, Western Union developed e-money with electronic fund transfer via telegram. In 1946, John Biggins invented Char-It Card, the first credit card. In 1971, the Bretton Woods agreement terminated the convertibility of the US dollar to gold.

European banks began offering mobile banking with primitive smartphones in 1999. Electronic money was further developed when contactless payment cards were issued in 2008 in UK for the first time. The year 2008 also witnessed the birth of bitcoin: a cryptic peer-to-peer electronic payment system (Bank of England, 2014). This evolution highlights the global shift towards a cashless economy. Cryptocurrencies such as bitcoin are being touted as the alternative to fiat currencies. There is an ongoing discussion among economists and Sharī'ah scholars in respect to cryptocurrencies. From a Sharī'ah perspective, what are the conditions of a currency? Can a cryptocurrency ever be considered as a currency and a valid mode of payment in Islamic finance? These are some of the questions we seek to explore in this chapter.

Money in conventional economics and finance

To complement the understanding of money, the following discussion gives a very brief and cursory view of money in conventional economics and finance. Jurists and economists may differ in the specifics of money as they are concerned with different aspects of money. Thus, Von Mises (1912) highlights the different objectives of jurists and economists. He states that jurists seek the definition of money to determine how monetary liabilities can be discharged, as money is a medium of payment to a jurist. He argues that economists may not adopt this point of view, as their concern is the advancement of economic theory.

Hence, economists have attempted to define money in their own unique way. Mankiw (2007) defines money as "the set of assets in the economy that people regularly use to buy goods and services from other people". While focusing on the general acceptability feature of money, McEachern (2012) argues that "any commodity that acquires a high degree of acceptability throughout an economy becomes money". Similarly, according to Groth (2012),

> In economics money is defined as an asset (a store of value) which functions as a generally accepted medium of exchange, i.e., it can in principle be used directly to buy any good. A note of IOU (a bill of exchange) may also be a medium of exchange, but it is not generally accepted and is therefore not money. Generally accepted mediums of exchange are also called means of payment. So money is characterized by being a fully liquid asset. An asset is fully liquid if it can be used directly, instantly, and without any costs or restrictions to make payments.

Economists tend to define money by the functions that money serves. These functions are: store of value, unit of account, medium of exchange and standard of deferred payment.

1) Store of value

   A store of value is an item that people can use to transfer purchasing power from the present to the future. In other words, it is something that is expected to retain its value in a reasonably predictable way over time. Gold or silver that was mined hundreds of years ago would still be valuable today. But perishable food would quickly become worthless, as it goes bad. So, gold or silver are good stores of value, but perishable food may not have such value.

2) Unit of account

   A unit of account is the yardstick people use to post prices and record debts. It is the thing that goods and services are priced in terms of, for example on menus, contracts or price labels. In modern economies, the unit of account is usually a currency, for example, the pound sterling in the United Kingdom, but it could be a type of commodity instead. In the past, items would often be priced in terms of something very common, such as staple foods ("bushels of wheat") or farm animals.

3) Medium of exchange

   A medium of exchange is an item that buyers give to sellers when they want to purchase goods and services. A medium of exchange is anything that is readily acceptable as payment: something that people hold because they plan to swap it for something else, rather than because they want the commodity itself.

4) Standard of deferred payment

   Money serves as a standard of payment contracted to be made at some future date. It facilitates borrowing and lending activities.

These functions are all closely linked to each other. For example, an asset is less useful as a medium of exchange if it will not be worth as much tomorrow – that is, if it is not a good store of value. Indeed, in several countries where the traditional currency has become a poor store of value due to very high rates of price inflation, or hyperinflation, foreign currencies have come to be used as an alternative medium of exchange. For example, in the 5 years after the end of the First World War, prices of goods in German marks doubled 38 times – meaning that something that cost 1 Deutschmark in 1918 would have cost over 300 billion Deutschmark in 1923. As a result, some people in Germany at the time began to use other currencies to buy and sell things instead. To make sure sterling does not lose its usefulness in exchange, one of the Bank of England's objectives is to safeguard the value of the currency. Although the medium of exchange needs to be a good store of value, there are many good stores of value that are not good media of exchange. Houses or real property generally, for example, tend to remain valuable over quite long periods of time, but cannot be easily passed around as payment.

The balancing of production and consumption takes place in the market, where the different producers meet to exchange goods and services by bargaining together. The function of money is to facilitate the business of the market by

acting as a common medium of exchange. Therefore, economists have identified six characteristics that allow money to serve its functions, with the most important being acceptability. The characteristics of money are:

1) Acceptability – Money must be widely acceptable as a medium of exchange.
2) Divisibility – Money must be easily divided into small parts so that people can purchase goods and services at any price.
3) Portability – Money must be easy to carry.
4) Scarcity – Money must be relatively scarce and hard for people to obtain.
5) Durability – Money must be able to withstand the wear and tear of many people using it.
6) Stability/uniformity – Money's value must remain relatively constant over long periods of time.

The philosophy of currencies in Islam

Islam does not recognise currency as a subject-matter of trade, except in some special cases. Currency needs no other utility besides being a medium of exchange. No other utility or feature is recognised in a unit of currency when traded for the same denomination. Therefore, there is no room for making profit through the exchange of these units *inter se*. Any profit earned through dealing in money (of the same currency), or the papers representing them, is interest, therefore, prohibited. Sharī'ah-compliant profit is generated when something that has intrinsic utility is sold for money or when different currencies are exchanged, one for another. Currency serves solely as a unit of measurement. Imam al-Ghazali (2011) states that money was created to serve as a standard between different assets. They are the means to all other assets; they are precious in themselves but not desired for themselves.

The Qur'an describes the role of money in the following manner:

> Do not entrust your wealth to the feeble-minded, which Allah has made a means of sustenance for you.
>
> *(Qur'an, 4:5)*

The word used to describe wealth in this verse is "sustenance" (*qiyām)*. *Qiyām* linguistically refers to supporting and maintaining. This word reflects the true essence of money; money is the means to maintain and support individuals, families and the world economy. It is the means to an end; not an end in, and of, itself. In Islam, the end goal of money is to sustain one's worldly affairs to facilitate focus on the Hereafter.

The primary sources of Islam have not defined any characteristic or condition for a currency. The Qur'an and Sunnah only refer to the prevalent money in circulation at the time of revelation: *dinar* and *dirham*. At the time of revelation, the bimetallic currency was in use. In fact, the two verses of the Qur'an (3:75 and 12:20)

show that the previous nations also used dirhams or silver coins. Imam Abd al-Barr states that Muslims of the prophetic era used the Roman dinars and Persian dirhams. In fact, throughout Islamic history, the prevailing currency in the state changed. Caliph Abdul Malik ibn Marwan introduced the first Islamic dinar and dirham in the year 76 *Hijrah*. During the Mamluk dynasty (872–922 AH/ 1468–1517 CE), *Fulūs* (copper coins) came into existence for use in small commercial transactions. Its purchasing power was very limited and was for common daily needs of life (Wan Yussof et al., 2015). In the Ottoman empire, money was further developed. The Ottomans produced the currency named *qāimah* in the form of paper money. In 1914, the Ottomans officially declared that paper money was the only legal tender recognised as the medium of exchange (Yaacob, 2014).

These developments during successive Islamic empires support the view that Islam has not defined currency; instead, it has left it to people to decide their currency. Ibn Taymiyyah (2005) states that the Sharī'ah has not defined any specific condition or definition for currency and money, and has instead left it to the *'urf* (prevailing custom) and understanding of the people. Hence, the Hanafī jurists state that assets or commodities become currency by *ta'āmul* (common usage) and *iṣṭilāḥ* (social concurrence) (al-Kasani, 1986). Imam Ahmad also opined that currency can be identified by the agreement of the people (Ibn Qudamah, 1997).

Muslim jurists state that currency is of two types: natural currency and customary currency. First, natural currency (*thaman khilqī*) refers to something originally created to serve as a medium of exchange. Gold and silver are examples of natural currency which are created to serve as a medium of exchange. Imam al-Ghazāli (2011) refers to gold and silver as natural currency which Allah, The Almighty, created for mankind to use as a standard and measure to price and valuate commodities. Second, customary currency (*thaman 'urfī*) is something adopted by the people as a medium of exchange. Commodity money and fiat currencies are common customary forms of currency.

Natural currency has inherent features which make it suitable to serve as money. Hence, the jurists state that it possesses intrinsic *thamaniyyah* (monetary features). On the other hand, customary currency does not inherently possess monetary features; however, it is adopted as a currency by the people. Customary currency such as commodity money and fiat money do not innately possess *thamaniyyah*. Although commodity money has intrinsic value, it does not have *thamaniyyah*. Humans naturally do not perceive commodities as a medium of exchange, rather, they are the subject of an exchange. On the other hand, fiat currencies do not have monetary features intrinsically; the *thamaniyyah* is extrinsic. Fiat currencies only serve as a medium of exchange from inception and do not represent a store of value.

The necessary juristic elements for a currency

There are three elements required for any valid currency in Islam: *māl* (wealth), *mutaqawwim* (possess legal value) and *thamaniyyah*.

The primary component for any counter value or consideration is *māl*. An accepted definition of a transaction among Muslim jurists is "an exchange of *māl* in consideration of *māl*" (al-Marghinani, 2008). Any consideration in a commutative contract must be *māl*. If the consideration is not *māl*, the contract is void (*bāṭil*). Therefore, the first fundamental requirement for money is that it must be *māl*. However, scholars differ in their understanding of *māl*.

Linguistically, *māl* in the Arabic language refers to anything which can be acquired and possessed; whether it is corporeal (*'ayn*) or usufruct (*manfa'ah*); examples of this include gold, silver, animals, plants and the benefit derived from assets such as living in homes, driving vehicles, etc. (Wohidul Islam, 1999). Something which cannot be possessed cannot be considered as *māl* linguistically. For example, birds in the sky, fish in the water, trees in forests are not *māl* in terms of the Arabic language as they are not in any person's possession (al-Zuhayli, 1985).

After the codification of Islamic law by various schools, the term *māl* was coined to denote different technical meanings and concepts. Thus, jurists from different schools differed in their understanding of *māl*. Wohidul Islam (1999) categorises the definitions of *māl* into two understandings: the Hanafi understanding and the majority understanding.

We learn from this that there are somewhat different explanations of *māl*. However, when closely examining the definitions, the variance is not due to a difference in the nature of *māl*, but simply due to the different ways of expression (Wohidul Islam, 1999). For example, some of the common definitions are:

1) *Māl* is what human instinct inclines to and which is capable of being stored for use during the time of necessity (Ibn Abidin, n.d.).
2) *Māl* is that which has been created for the goodness of human beings. *Māl* brings with it scarcity and stinginess (Uthmani, 2014).
3) *Māl* is that which is normally desired and can be stored up for the time of need (Hayder, 2003).

According to the Hanafi jurists, *māl* is "what is normally desired and can be stored up for the time of need". This definition denotes that the two key criteria for defining *māl* in the Hanafis' view are "desirability" and "storability". The first criterion clearly links *māl* to its linguistic root, which means inclination or desire. Mufti Taqi Uthmani (2014) describes desirability as something which is beneficial. However, Shaykh Salah Abul Hāj (2005) states that the condition of desirability excludes undesirable articles of trade such as humans, etc. Ibn 'Ābidīn presents another definition of *māl* as "something created for the benefit of man which people hoard and aspire" (Uthmani, 2014). The second facet in the Hanafi explanation is storability. Storability simply means that something can be retrieved for use later. Thus, thin air, an odour or scent, a passing thought in one's mind are not 'storable'. The jurists put this condition down for *māl* because only storable items can be retrieved and used, and the entire purpose of *māl* is usage.

Although some Hanafi jurists have stated that *māl* must be a physical entity, Mufti Taqi Uthmani (2014) dispels this argument and states that the Qur'an and Sunnah have not explicitly defined *māl*, rather, Sharī'ah has left it to the understanding of people. Furthermore, he argues that some *furu'* (substantive laws) in the Hanafi school discuss intangibles as *māl*. He thereafter quotes the *fatāwā* of Hanafi jurists which consider electricity and gas as *māl* despite being intangible. Thus, intangibles can also be *māl* on condition that they are desirable and retrievable. It is not necessary for intangible *māl* to remain after usage; it may be an intangible which is consumed and depleted upon usage. The condition of perpetuity is not required in physical *māl* either; hence, food is *māl* despite being used by consumption.

The Shafi'i jurists have included usufruct in the definition of *māl*. Al-Zarkashi states that, "*māl* is what gives benefit, i.e. prepared to give benefit", and added that *māl* can be material objects or usufructs (al-Zarkashi, n.d). Al-Suyuti (2004) states:

> The terminology *māl* should not be construed except as to what has value with which it is exchangeable; and the destructor of it would be made liable to pay compensation; and what the people would not usually throw away or disown, such as money, and the likes.
>
> *(Wohidul Islam, 1999)*

From among the Hanbali jurists, al-Kharqi states that *māl* is something in which there exists a lawful benefit (Wohidul Islam, 1999). Al-Buhūtī (2015) elaborates on this definition and states that something in which there is no benefit in essence, such as insects, or where there is benefit but it is unlawful in Islam, such as wine, cannot be considered as *māl*.

Another requirement for *māl* itself to be exchangeable and tradeable is that it must be *mutaqawwim* (possess legal value) for transaction to be legally sound (*ṣaḥīḥ*). *Mutaqawwim* refers to an item or subject being lawful to use in Sharī'ah. Therefore, Ali Haydar (2003) states that the criteria for any item to be tradeable and exchangeable are *Tamawwul* and *Taqawwum*.

Tamawwul refers to anything used as *māl*. *Taqawwum* refers to the item being lawful in Sharī'ah as a result of being considered valuable. *Thamaniyyah* refers to something possessing currency-like features where it is considered as a medium of exchange, a unit of account and a store of value.

Establishing a currency in Islam

As earlier mentioned, the Qur'an and Sunnah have not defined currency, instead, they have left it to the custom of the people. This is a common feature for those aspects of law which are fluid, dynamic and adjustable. Shaykh Abdullah al-Mani (1984) states, "Currency is anything upon which there is concurrence, whether by government authority or public practice".

Classical scholars used the terms *ta'āmul* and *iṣṭilāh* when discussing currency establishment. *Ta'āmul* refers to common usage. *Iṣṭilāh* refers to social concurrence. *Ta'āmul* is established when the use of a thing becomes dominant and becomes the standard in people's affairs and dealings. *Iṣṭilāḥ* (social concurrence) is similar to *ta'āmul* and refers to the concurrence of people on using something in a particular way. Imam Abū Ḥanīfah and Imam Abū Yūsuf were of the opinion that a commodity can be considered a currency by the *iṣṭilāḥ* of the two transacting parties, whereas Imam Muhammad viewed that for commodities to be considered currency, concurrence among the masses is required. Contemporary Islamic scholars such as Mufti Muhammad Taqi Uthmani (2014) argue that Imam Muhammad's view is the preponderant position in the Hanafi school.

Besides the dinar and dirham, anything else which was adopted as a currency generally went through *ta'āmul* and *iṣṭilāḥ*. Assets and raw metals were commonly used in daily chores and affairs; they were not regarded as a currency and a medium of exchange. Such assets and raw materials only became a medium of exchange after people started to use them as such. *Ta'āmul* and *iṣṭilāḥ* were the indicators of something transforming from *'urūḍ* (commodities) to *thaman* (money). *Ta'āmul* is a natural process which takes time to establish. A habit is formed after an industry, area or market deal with something as money over a given period of time, establishing a *ta'āmul*. Some of the apparent indicators of *ta'āmul* are:

- People regard them as money extemporaneously.
- The first description or definition that comes to mind of such assets is of money.
- *Thamaniyyah* becomes their second nature and innate trait.
- The obvious form of payment becomes these assets.

Assets and raw materials which become a currency can also be deactivated or withdrawn from being a currency when they are no longer used as such. The removal of *thamaniyyah* reverts them back to assets and raw metals, which represent their primary function. This natural process did not transpire in fiat currencies. Interestingly, a system was there which legislated the use of a particular thing as a currency. From its inception, it was made to serve as a medium of exchange. These fiat currencies have no other utility or function. They were made to be the medium of exchange in the payment system.

A *fiqh* analysis of bitcoin

For bitcoin to be considered a currency, it must possess the above three characteristics defining currencies in Islam: *māl*, *taqawwum* and *thamaniyyah*. For anything to be considered as *māl*, it must have desirability and storability. Bitcoin possesses features which give it desirability. For example, the blockchain technology behind bitcoin, the replacement of trusted party intermediations with

the proof-of-work protocol, decentralisation, limited supply and borderless payments with fewer transactional fees make bitcoin desirable. This has resulted in an increasing demand for bitcoin. With respect to storability, bitcoins are encoded within the blockchain and are entries on a public ledger. One's ownership is reflected by the individual bitcoin address being credited with a balance. Considering that bitcoins are merely digits and entries on a public ledger, there is no evidence or premise indicating to them being unlawful. Hence, bitcoins have *taqawwum*.

In terms of *thamaniyyah*, bitcoin was created as a peer-to-peer payment system. As a result, they are established as currencies and used as such, resulting in *istilah* (social concurrence) from the outset as a currency in Sharī'ah. Bitcoin was created as a medium of exchange and resembles the notion of natural currency. Electronic fiat currencies too are just numbers on a screen. They were launched and created as a currency from the outset. Their primary function is a currency even if people invest in them. Likewise, bitcoin was made to serve as a peer-to-peer payment system and has no real alternative function. Bitcoin has monetary use and people have assigned "a value" to it. A "value" is envisaged by the people as they purchase, sell, accept and exchange bitcoin for the underpinning notional value. The value of things can be manipulated, exploited and speculated. These are external issues which require regulation and control.

The philosophy of value needs reconsideration. The technological developments in the last century have reshaped and redefined our way of life. For example, value is represented today by mere digits on a bank app which are backed by the government. Society gives value to digits displayed in their bank balances because of the system and acceptability of these digits among people. If an alternative system was created which gave a certain degree of trust, security, ease of use and similar features, could the digits on that system not be considered as representing value? Value is a concept; something people have social concurrence on. Value is something which attracts *mayl* (inclination). This value is a meaning, a notion underpinning bitcoin digits. The digits shown as a balance in digital wallets and on the public ledgers represent a value in the minds of people. People have an economic inclination to it and have economic benefit from bitcoin. Thus, bitcoin also possesses *thamaniyyah*.

Considering the above elements, bitcoin in and of itself does not contravene Sharī'ah principles. The permissibility of investing in bitcoin will depend on the contracts and instruments used to invest. If the contracts do not defy any Sharī'ah principles, the investment in bitcoin will be Sharī'ah compliant.

Is centralisation necessary for money in Islam?

Until the reign of Abdul Malik ibn Marwān, the Islamic caliphate did not control the currency and its coinage. The Islamic caliphate did not have a "Royal Mint", however, 'Umar ibn al-Khaṭṭāb (may Allah be pleased with him) did introduce some measures to stabilise the alloy, content and weight of silver coins.

In the year 74 AH, Abdul Malik ibn Marwān established a monetary system and an Islamic dirham. Furthermore, mint houses were established which took control of the coins in circulation and improved the quality and consistency of the currencies (Zerra-Nezhad, 2004).

In the early decades of Islam, money was thus decentralised and left to public practice. However, one may argue that money was still centralised since the Muslims used the dinar – a Byzantine currency – and dirham – a Persian currency.

The Hanafi jurists state that *ta'āmul* can establish currency just as coinage and minting from the government established currency. The Hanafi jurists reasoned that anything minted and centralised would give a known benchmark and point of reference, thus creating ease in the markets and facilitating transactions. On the other hand, the Shafi'ī jurists state that it is disliked for other than the government to mint coins and currency, as it should be the exclusive role of the government. Furthermore, it was a secure method to combat counterfeiting, forgery and corruption (al-Suyuti, 2011).

The Hanbali jurists are explicit in stating that it is not permissible for the Sultan or head of state to ban the currency commonly used by people, as it will cause financial harm to the people, unless they are recompensed proportionately in the new currency without a fee (Ibn Qudamah, 1997). Considering the benefit and harm for the masses, Imam al-Ṣuyūṭī (1983) also states that it is disliked for the government to withdraw or nullify a currency commonly used among people. Al-Buhūtī (2015) says that the reason why the government should solely take control of minting is to benefit the people and to make it easy for them in their transactions and affairs.

From earlier, it is evident that the jurists and economists in Islam favoured a centralised monetary system because of the following reasons:

1) Trust in the currency;
2) Presence of a regulatory framework;
3) Governance framework;
4) Wide acceptance;
5) Ease for the people in pricing and transacting; and
6) A benchmark for transactions.

Thus, if these characteristics are found in a decentralised system, there is nothing to prohibit such a system in Islam. These underpinning principles are the ideals for currency in Islam. The government and ruling authority would have been the most efficient and instrumental in achieving these ideals. Against this backdrop, it seems that classical scholars favoured a centralised system. However, the reality is that the Qur'an and Sunnah have not defined currency, instead, they have left it to the understanding of the people and custom of the people as mentioned by Imam Ibn Taymiyyah. This is a common feature for those aspects of law which are fluid, dynamic and adjustable.

Considering that a centralised system is not necessary, Shaykh Abdullah al-Mani' (1984) states, "Money is thus whatever is agreed to be such, whether by government authority or public practice". Thus, currency can be determined by centralisation and decentralisation. If a decentralised system can provide benefits similar to that of a centralised system, a medium of exchange can become money through public practice and widespread acceptance.

Conclusion

Although bitcoin can be considered a currency from an Islamic-jurisprudential perspective, there are many questions and uncertainties in respect to bitcoin. With the lack of regulatory safeguards and complex technology, bitcoin has become an attractive prospect to prevent money laundering and illegal activity, as there is an extra layer of secrecy within the industry protecting identity. Furthermore, any regulatory changes can severely impact the bitcoin industry. Only time will tell the trajectory of the cryptocurrency market.

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10

CROWDFUNDING IN ISLAMIC FINANCE

Ensuring proper Sharī'ah oversight

Muhammad Al-Amine Muhammad Al-Bashir

Introduction

Crowdfunding is a financial innovation that facilitates financial intermediation through the use of online web-based platforms to connect fund users and fund providers. Considered to be one of the most visible manifestations of fintech, it is one the fastest growing segments of the financial industry. Crowdfunding is generally either in the form of donations (philanthropic projects) or direct financing (debt or equity). The latter needs more investigation from an Islamic perspective due to the presence of economic interest. It is believed that the benefits of crowdfunding are enormous and could outweigh its evident risks and downsides; however, it is also recognised that there are Sharī'ah and legal challenges that need to be addressed.

The chapter will touch on the concept of crowdfunding, its origin and the reasons behind its rapid growth and development as well as its benefits and risks. It will further examine the concept by categorising key elements that need careful assessment in the adoption of crowdfunding in Islamic finance. For instance, there are multiple financing relationships such as P2P financing, B2C financing and B2B financing. Significant differences also exist between the debt- and equity-based crowdfunding models. Debt crowdfunding models need to be assessed in terms of Sharī'ah compliance and alignment with Islamic law principles. It is necessary to find out whether these various models can be adopted and executed through Islamic debt-based contracts such as *murābahah* (cost-plus sale contract), *istisnā'* (construction contract), *salam* (forward sale contract), *ijārah* (lease contract) and *tawarruq* (monetisation or multiparty cost plus sale) or whether new *ijtihad* (legal interpretation effort) and thinking is needed to accommodate what is compatible and reject what is not. The equity-based crowdfunding model, despite its relatively small size, has various business models

that need careful evaluation from the Sharī'ah perspective. It is important for equity crowdfunding to abide by the prevalent Islamic finance methodology in equity financing such as the Sharī'ah compliant nature of the company prime activities, its debt and receivable financial ratio and other parameters considered as preconditions for equity investment in Islamic finance.

It is equally important to note that any Islamic assessment of debt crowdfunding or equity crowdfunding needs to be aligned with local laws and regulations for a smooth implementation. Unfortunately, and due to the infancy of the industry, there is a great variety of regulations that need to be taken into consideration. Thus, while in some jurisdictions business or investment-based crowdfunding is unregulated, in others some of its forms are prohibited. A third group preferred to classify the platform companies as an intermediary that requires licensing and registration, while others elected to regulate them as banks. Finally, Sharī'ah compliance and governance is an integral part of any Islamic finance solution and, therefore, crowdfunding platforms, whether they are debt-based or equity-based, need to have proper supervision and Sharī'ah audits. The chapter concludes with some recommendations that are necessary for the development of a viable and Sharī'ah-compliant crowdfunding industry.

The nature and definition of crowdfunding

Looking at the prevalent definitions of crowdfunding, one would observe that these definitions vary, but often include some key components: (i) raising funds in small amounts, (ii) from many parties, generally non-professional investors, (iii) to finance an entrepreneur or a project and (iv) using an internet platform that connects investors and entrepreneurs. In other words, crowdfunding brings together three parties: the project owner or entrepreneur who is seeking to get financed; the investor as a part of a huge group of people financing the project; and a crowdfunding platform, which acts as an intermediary between the project owner and the investor. Moreover, crowdfunding can be a P2P, B2C or B2B fundraising.

According to the *Cambridge Advanced Learner's Dictionary*, crowdfunding is described as "the practice of getting a large number of people to each give small amounts of money in order to provide financing for a business project, typically using the internet" (Cambridge Advanced Learner's Dictionary 2017). A similar definition is given by the *English Oxford Dictionary* which defines crowdfunding as the "practice of funding a project or venture by raising many small amounts of money from a large number of people, typically via the Internet" (Oxford English Dictionary 2017).

The International Association of Securities Commission (IOSCO) defines crowdfunding as

> an umbrella term that describes the use of small amounts of money, obtained from a large number of individuals or organizations, to raise funds for a

> project, business/personal loan or other financing needs through online web-based platforms. Peer-to-peer lending is a form of crowd-funding used to fund loans, which are paid back with interest. Equity crowd-funding is the raising of capital through the issuance of stock to a number of individual investors using the same method as crowd-funding.
>
> *(Kirby and Worner 2018)*

The Consultative Group to Assist the Poor defines crowdfunding as

> a method of financing whereby small amounts of funds are raised from large numbers of individuals or legal entities to fund businesses, specific projects, individual consumption, or other needs. It involves bypassing traditional financial intermediaries and using online web-based platforms to connect users of funds with retail funders.
>
> *(Jenik et al. 2018)*

Linking the definition of crowdfunding to Islamic finance, Bahrain, in its newly issued Directives, defines Sharī'ah-compliant Financing Crowdfunding Platform Person-to-Business (P2B) as "a financing e-platform which takes place on an online portal, on which people finance other businesses on a Sharī'ah compliant basis, for the purpose of gaining a financial return over a pre-specified period of time" (Central Bank of Bahrain 2017).

However, a closer look at the mentioned definitions, and for the sake of better understanding of the structural relationship between the parties, their rights and obligations from Sharī'ah and legal perspectives, one would realise that they are neither consistent nor conclusive. This is perhaps due to the relevant regulatory frameworks still being in their infancy.

The first-ever crowdfunding platform was launched in 2005 in London with the objective of bringing together individuals who have money to lend and individuals who wish to borrow. Therefore, crowdfunding is intended to circumvent the long and difficult process of the traditional banking system, but also looks for lower rates on loans and better returns for lenders (Sadzius and Sadzius 2017). At the same time, the regulations of the crowdfunding industry are still developing and, therefore, definitions are not inclusive and precise. In fact, some of these regulations took a while to emerge in some jurisdictions and they are still in the process of being created in others. Moreover, an analysis of various laws of different jurisdictions that govern the activities of the three parties involved in crowdfunding shows that legal and regulatory frameworks vary from one jurisdiction to another. However, the fact remains that regulations and supervision are the cornerstones of a stable financial sector including crowdfunding (Sadzius and Sadzius 2017).

From a Sharī'ah perspective it is not possible to have a proper understating of the concept of crowdfunding unless the distinct roles of the different parties involved are established, their rights and obligations are outlined and the contractual

relationship between and among them is determined. This is a prerequisite irrespective of whether the transaction is debt- or equity-based. Among the parties involved in a crowdfunding transaction, namely the fund seeker or entrepreneur, the fund provider or investor and the platform operator, it is the role of the platform operator that is extremely important in clarifying this relationship. In many instances, looking at the traditional crowdfunding relationship, it can be noticed that loans are granted directly from the funder to the beneficiary. In such a relationship, the role of the platform operator is limited to bringing the two parties together. However, the situation would be more complicated in a model where the platform operator is not only introducing the funders to the entrepreneur but also collecting the funds from funders and then lending these funds to the beneficiary. Under such a model, the beneficiary enters into only a single financing agreement with the operator rather than numerous loan agreements with the individual funders. At the time of repayment, the operator distributes the proceeds pro rata among the funders. The second-structure model will transform the operations of the platform as a *de facto* banking activity and the collection of funds by the platform is analogous to deposit-taking activities by banks, while granting a loan to the beneficiaries is similar to the lending activities of banks (Wojdyło and Pietkiewicz 2018).

It should be noted that the first generation of loan-based crowdfunding is structured in a form whereby the role of platform operator is to identify and present the different projects and the prospective finance providers would choose the projects they were willing to fund according to their own preferences. The platforms could encourage financiers to diversify their portfolio over a number of projects to reduce risks, but the selection and composition of the portfolio would have to be done by the financiers themselves. They have to do their own risk assessment. In contrast, in the second-generation model, investors do not select specific projects. The platform will structure the product, split the amount to the financier who wants to invest and allocate the several different available funding requests. This diversification is a risk-management service provided by the platform operator (Islamic Financial Services Board 2017).

The differences in the mentioned model are seen in some of the regulations of crowdfunding businesses emanating from some Muslim countries. For instance, the Bahrain Directives on Sharīʿah-compliant crowdfunding states, "The role of Sharīʿah compliant Crowdfunding Operators is restricted to arranging deals, bringing together financiers/investors and fundraisers. SCF [Sharīʿah-compliant Financing-based] Crowdfunding platform operators are strictly prohibited from providing any advice on deals". The Directives also note that, "It is the responsibility of the financiers/investors to perform their own creditworthiness assessments on the fundraisers" (Central Bank of Bahrain 2017).

Based on this, and due to the incompleteness of the prevalent definitions, it is possible to define investment crowdfunding as the practice of getting a large number of investors, based on an agency or brokerage relationship with a platform, to collect small amounts of money from each of them to finance a project or a person through a Sharīʿah-compliant mode of financing that could be a debt

or equity contract, in exchange for a specific fee as consideration, typically using the internet.

Types of crowdfunding

As stated earlier, crowdfunding is one of the important segments of fintech. It is generally classified into four types: donation-based crowdfunding, rewards-based, lending-based and equity investing crowdfunding.

- In the *donation-based crowdfunding*, funders of the project are not looking for financial gains. They are satisfied by supporting causes they believe in. Typically, they receive nothing tangible in return for their capital commitments. The beneficiaries in this category are generally civic groups like religious and charitable institutions, educational institutions, etc.
- In *rewards-based crowdfunding*, funders receive some kind of "reward" in exchange for their capital commitment. This could be public recognition or access to special events (Best and Rehman, 2013).
- In *debt-based crowdfunding*, lenders give out loans to worthwhile projects. They assume that the company will pay back the loan over time and they will receive interest or profit.
- In *equity investment crowdfunding*, funders receive equity in the business. Although the capital is not guaranteed, they are expected to benefit from the growth in capital value of a company if the business succeeds. Equity-based crowdfunding is basically about the issuance of securities.

Although each of these four models can be subdivided into further categories, for the purpose of this chapter the focus is on the subdivision of the two investment-based crowdfunding types, namely equity and debt-based crowdfunding. Equity crowdfunding can be divided into:

1. Equity-based crowdfunding – sale of registered securities, by mostly early-stage businesses, to sophisticated, institutional and retail investors.
2. Equity-based real-estate crowdfunding – direct investment into a property by individuals, usually through the sale of a registered security in a special purpose vehicle (SPV).

The loan-based crowdfunding on the other hand can be divided into:

1. Peer-to-peer business lending – secured and unsecured debt-based transactions between individuals/institutions and businesses with trading history – mostly for small and medium-sized enterprises (SMEs).
2. Peer-to-peer consumer lending – debt-based transactions between individuals/institutions and individuals including sole traders; most are unsecured personal loans.

3. Peer-to-peer property lending – property-based secured debt transactions between individuals/institutions and, mostly, businesses; most of which are property-development businesses (Ziegler et al. 2017).

Islamic debt-based crowdfunding

Debt crowdfunding, as is the case with other forms of debt-based financing, can be described as when the client is looking to acquire specific assets. In a conventional set-up, this is done through a loan with interest, while in Islamic finance, this can be achieved through *murābahah*, *wakālah (agency)*, *istisnā'*, *salam, ijārah* and commodity *murābahah*.

Thus, in cases where the fund seeker is looking to receive cash and not specific assets, the objective can be realised in a conventional banking set-up through a loan with interest agreement between the creditor and borrower while the platform will be playing the role of an intermediary. However, this is obviously not possible in Sharī'ah-compliant crowdfunding due to the prohibition of *ribā*. The Sharī'ah-compliant alternative would be through commodity *murābaḥah* (*tawarruq*) or through *wakālah* between the fund seeker and fund provider while the platform is just playing the role of a *simsār* (broker).

However, a practical issue might arise with such a case where individual financiers have to deal directly with the funded entity or person. The problem arises when the value of the asset cannot be funded by just one financier. In other words, when the cost of the financed asset exceeds the funding amount provided by each financer and it is not sufficient for the acquisition of the asset, there is a need to pool the requested funds from several financiers who should be owning the asset jointly based on *mushārakah* before selling it to the fund seeker. Here, there is a need for a party that will coordinate the partnership or *musharākah* relationship among the fund providers and then with the fund recipient. The platform can play that role. However, the issue will be simplified if we adopt the *wakālah* structure. Based on a *wakālah* structure, even if the asset to be funded requires the contribution of several financers, the *wakil* or investment agent will raise the fund and then purchase the asset from the supplier before selling it to the fund recipient.

If the extension of financing in the case of debt-based crowdfunding can only be done through commodity *murābaḥah* or *tawarruq*, the immediate questions will be: (a) how will the internet platform be able to handle commodity *murābaḥah* transactions with different brokers and suppliers?; (b) given the small amounts involved in these transactions and the large number of deals to be conducted, will a commodity *murābaḥah* be practically possible and economically sustainable?; (c) is it economically viable to have a broker fee in small transactions of US$100 commodity *murābaḥah*?; (d) taking these costs into consideration, would a Sharī'ah-compliant debt-based crowdfunding platform be cost effective and competitive vis-à-vis conventional crowdfunding platforms or existing financial

institutions? The last question is of critical importance as one of the main selling points for fintech in general is that it will help in reducing cost.

Due to the challenges described earlier to operating a crowdfunding platform based on commodity *murābaḥah*, an alternative structure to finance clients looking for cash financing can be a parallel *wakālah* where the platform would play the role of an investment agent. It would collect funds from the fund providers based on *wakālah* and give it to the fund seeker on a parallel *wakālah*. Based on the investment *wakālah* terms, the fund seeker will invest the fund provided into his business with an expected rate of return agreed to be paid. The platform can take the fund from the fund providers at a specific expected return and add its margin when providing it to the fund seeker or agree that anything above the expected return shall be taken by the platform as a performance fee.

However, if the platform chooses to have its relationship with the fund seeker based on *tawarruq*, perhaps to minimise the risk associated with agency, then it needs to enter into a commodity *murābaḥah* with the fund seeker. It is worth mentioning here that the existence of a highly liquid commodity that can be bought and sold in homogenous qualities and in any desired quantity and that is preferably traded on an electronic exchange with high turnovers, as is the case with most goods used for commodity *murābaḥah* in Islamic banking, now will be a necessity. However, the existence of such viable avenues for commodity *murābaḥah* transactions may not be easily available in most Muslim countries. Even in countries where such a market is available it will create another layer in Islamic crowdfunding compared to a conventional one.

In cases where the objective of the client or fund seeker is to acquire a specific asset and not cash, the role of the platform will be once again structured as an intermediary (*simsār)* or investment agent (*wakil*). If the platform is just an intermediary, the fund provider needs to acquire the requested goods from the supplier and then sell them directly to the client, while the platform would only facilitate the transaction. However, if the platform is playing the role of a *wakil* or investment agent for the fund provider, then it will be playing the role of a fund manager who will buy the assets from the supplier and sell them to the fund seeker.

It is worth stressing here that from a practical and legal point of view, the platform manager needs to be licensed as an asset manager and therefore have the required expertise before they start managing the platform.

In cases where the fund seeker is a small farmer that needs financing to cultivate his land, the platform can suggest *salam* as the mode of finance for the transaction. It will collect the needed funds from investors based on agency and then channel the collected funds to the fund seeker in the form of cash through a *salam* contract. However, from a practical point of view, in a *salam* arrangement the fund providers receive goods, not cash, at the maturity of the transaction after the farmer harvests his farm. Therefore, there is a need for a mechanism or a liquid market that would allow the fund providers, through a parallel *salam*, to sell out these goods immediately and get back their principal and profit.

The same process can be applied through *istisnā'* and parallel *istisnā'* for cases where the fund seeker is a micro-manufacturer.

Based on this, we can conclude that debt-based crowdfunding can be structured through *wakalah*- or *samsarah*- (brokerage) based structures with regard to the contractual relationship between the parties, while the financing aspect can be done through commodity *murābaḥah*, *salam*, *istisnā'* and *ijarāh*.

On the other hand, and with regard to the debt-based crowdfunding, it is clear that any platform offering the opportunity to finance others has to obey certain rules designed to ring-fence financiers' money if the platform itself becomes financially troubled. These rules will be generally detailed in the national regulations of the jurisdiction licencing the platform For instance, the relevant COB rules of the Dubai Financial Services Authority (DFSA) provides that an operator must disclose the main risks to lenders or investors of using a crowdfunding platform, such as the possibility that the lender or investor may lose all or part of their money, or may experience delays in being paid, or the fact that the business is a new business and therefore may involve high risk. It should also disclose information about default or failure rates. The platform is also required to provide information about the services provided and how it functions. Furthermore, the operator is under obligation to disclose detailed information about each borrower or issuer.

Islamic equity crowdfunding

The *wakālah* and *samsarah* structures discussed earlier could also be applied in an equity-based crowdfunding investment, and therefore the fund will be collected by the platform based on investment *wakālah* or agency or just on brokerage and then invested in the project or business. In a case where the platform is just a broker, the various investors have to purchase or subscribe to the shares of the target company directly while the platform will be just a facilitator. However, if the platform is an investment agent, then the agent will collect the fund and then invest it by buying the shares and allocate it to the various investors based on the percentage of fund invested by each of them.

However, if the transaction is an equity transaction, all Sharī'ah conditions for investment in equity will apply.

It is necessary to establish at the outset whether the main activities of the targeted company are permissible, mixed or prohibited activities. Accordingly, the selected companies for crowdfunding investment can be divided into the following sections:

Permissible companies: It is permissible to invest or participate in the shareholding of companies operating for permissible purposes and in permissible activities, whose Articles of Agreement stipulate that their purposes, activities, contracts and mechanisms should be in compliance with Sharī'ah principles.

The most prominent example for such kinds of companies are the Islamic financial institutions.

Prohibited companies: It is not permissible to invest or participate in joint-stock companies with prohibited purposes and activities, including all prohibited products, transactions, contracts and services, whether through manufacturing, production, marketing, promotion, transfer, sale, purchase of service or mediation, such as companies dealing with alcohol, tobacco, pork, gambling, as well as interest-based banks, commercial insurance, companies dealing in pornography, investment funds in interest-based bonds and debt-dealing companies, whether through debt-discounting instruments or collecting fee for mere guarantee. These types of companies also include hotels and tourist resorts that provide non-Sharī'ah-compliant services and market them or participate in providing them. The list of non-permissible companies also includes companies dealing in gold and silver on a deferred-payment basis or currency-exchange forward and futures. The list also includes companies dealing in activities that harm the environment or carry out research that contravenes the provisions of Islamic law.

Mixed companies: These are companies whose main purpose and activities are permissible, but are also involved in some non-Sharī'ah-compliant transactions such as borrowing or depositing, sometimes on an interest basis. This will apply to crowdfunding investment if the targeted project or business exists for just a start-up. When crowdfunding investors are investing in the shares of these types of companies, the following rulings shall be observed:

- The total amount borrowed by interest – whether long-term or short-term – should not exceed 30 per cent of the total market capitalisation of the company, bearing in mind that borrowing through interest is prohibited, whatever the amount. The market value of the company is derived from its average value for each quarter of the year. If the company is not listed, then we can refer to its asset and debt percentage.
- The total amount of interest-taking deposit, whether long-term or short-term, should not exceed 30 per cent of the total market capitalisation of the company shall not exceed 30 per cent of the total assets or market value of the company, while bearing in mind that borrowing with interest is prohibited, irrespective of the amount, even if it is just 1 dollar.
- The total amount of income generated from prohibited components does not exceed 5 per cent of the total income of the company, whether this income is the result of prohibited transactions or ownership of prohibited property.
- It is permissible to acquire the shares of mixed companies whose assets are a combination of properties, usufructs, debts, money and financial rights, if the assets other than money and debts during the preceding financial period are not less than 30 per cent.

- The permissibility of acquiring and investing in shares of mixed companies is based on need and necessity. Therefore, if there are enough companies with clean portfolios for investment there is no need to invest in mixed companies.
- The reference to the activities of the company and the percentages of its borrowing and deposit shall be based on the latest-issued financial statements, annual, quarterly or monthly, whether audited or unaudited.
- If the percentage of financials exceeds what was stipulated for a mixed company, the shares of such investment shall be disposed of and liquidated through immediate sale if this does not lead to a loss, otherwise the sale shall be within 90 days. After this grace period, such shares shall be disposed, whether there is a loss or not. This period was determined on the basis of diligence, since stock prices often change in such a period.
- Shares of companies that do not comply with all or some of the above Sharī'ah rulings may be owned if the target company has undertaken to convert into a Sharī'ah-compliant company within a well-determined period. This will be done through purchasing a controlling or influential voting shares that will impact the decision-making process that will help in substantial change in the Sharī'ah aspects of the company. However, if it has been realised that it is not possible to convert the company within the specified period, the shares shall be disposed of through sale.
- It is necessary to ensure that all shares to be issued, or issued by the company, are common shares and not preferred shares in terms of liquidity or return. Priority in terms of voting and administration is permissible and will be subject to the agreement of the shareholders.

Additional rulings that need to be observed by equity crowdfunding investors include the following:

1. Avoiding dealing in conventional derivatives contracts whether they are futures, options, etc.
2. If the targeted company is a start-up, it is not possible to trade its shares until a portion of the collected capital is transformed into non-cash assets such as tangible assets, properties, usufructs and financial rights.
3. Making sure that future financing of the company will be Sharī'ah compliant to avoid any fire sale due to non-Sharī'ah compliance in future.
4. It is necessary to have the undertakings and guarantees that the company will continue operating in accordance with Sharī'ah rulings.
5. It is important that the company is not involved in short selling, margin trading or guaranteeing a non-Sharī'ah-compliant debt (Accounting and Auditing Organization for Islamic Financial Institutions 2015).

Besides this specific Sharī'ah guidance and the principles regarding debt or equity-based crowdfunding, there are also some other general Sharī'ah principles that need to be highlighted regarding the fintech industry in general. It is obvious that the adoption of crowdfunding is clearly not without risks, particularly in the wake of rising cybersecurity threats that could compromise safeguards that protect financial assets and customer data. Therefore, effective risk mitigation techniques in this area are extremely needed. At the same time, it is incumbent upon Islamic finance players, regulators and decision-makers to encourage productive innovation that will drive costs down and improve the quality of service to consumers. Islamic law is open to any initiative of this nature as long as it does not contradict its general principles. To guide the innovative ideas in fintech in general and crowdfunding in particular and outlining the parameters that should guide financial regulators and policy-makers, the following Sharī'ah principles need to be taken into consideration:

- Wherever there is a *maslahah* for mankind, Sharī'ah will not stand against it. Therefore, the presumed benefits of fintech, such as reduced transaction costs, time efficiency and other benefits need to be maintained. As is stated by Ibn Qayyim Al-Jawziyyah in his book *I'lam al-muwaqqi'in*:

  > The Sharī'ah edifice and foundations [embody] wisdom and benefits for humanity in their worldly life and afterlife. All of it is justice, all of it is benefits, and all of it is wisdom. Any issue [in which the ruling] departs from justice to injustice, from mercy to its opposite, from benefit to harm, and from wisdom to arbitrariness is not, in fact, part of the Sharī'ah, even if it has been attributed to it by a process of interpretation.
  >
  > *(Ibn Qayyim 1991)*

- The use of technological innovation in finance would definitely bring benefits to many. However, it is also important that we make sure that the use of technology will not result into harm to others. This is based on the well-known Sharī'ah principle that: "Islam forbids people to cause detriment on themselves or on others" (*la darar wa la dirar*).
- These principles need to be complemented by the Sharī'ah principle that avoiding detriment takes precedence over bringing about benefit: *dar'u al-mafasid awla min jalb al-masalih*.
- The interaction between Islamic finance and modern technology already has some precedents that show that the coexistence between the two is possible. The Council of the Islamic Fiqh Academy (in its resolution No. 52/3/6/ in its sixth session held in Jeddah, Kingdom of Saudi Arabia, from 14 to 20 March 1990), declared the permissibility of execution of contracts through modern means of communication such as telegraph, telex, fax telephone and wireless and computer screen, after taking into consideration the enormous development in the field of communication instruments and the current

practice of using them in the execution of contracts to ensure prompt financial transactions. This move has a great impact on the established principles that a contract between the two parties requires the unity of *majlis al-aqd* or contractual session (except in the case of will and agency), and conformity of the offer with acceptance and the lack of any sign indicating unwillingness of a party, and the continuity of the offer and acceptance according to custom. Therefore, the Sharī'ah principles are flexible enough to adopt new technological innovation relating to finance as long as it does not contradict explicit Sharī'ah principles. Moreover, the acceptability of credit cards is another example, among others.

- It is also pertinent that the innovation in fintech should be free from all non-Sharī'ah-compliant activities such as injustice, fraud, *gharar* and other elements prohibited under the law.

Advantages and disadvantages of crowdfunding

The fintech disruption and its impact on crowdfunding in particular was made possible by the digital revolution and the widespread penetration of technology-driven applications, which is in almost every segment of the financial sector. Fintech in general, and crowdfunding in particular, have immense potential and can open various possibilities for improving efficiencies, reducing wastage and enhancing customer experience. Through the use of technology, consumers are expected to enjoy more competitive financial services in terms of cost, as financial transactions will become more automated, user-friendly and more convenient. Moreover, through crowdfunding, investors will be enjoying higher returns by investing directly into the business ventures that they intend to finance via the online financing marketplace. However, several specific advantages and disadvantages of financing different projects through crowdfunding can be identified. The following are some of the advantages:

1. *Access to capital*. Crowdfunding gives start-up companies as well as individual entrepreneurs the opportunity to fund their projects when other sources of financing such as banks or venture capitals are unavailable to support their businesses.
2. *Time efficiency*. It is a quick way to raise money for projects compared to the long process through bank and venture capitalists where longer time is required in order to scrutinise the business.
3. *Marketing mechanism*. Announcement of a project via the internet can be a valuable form of marketing and can attract media attention as well as feedback and professional guidance on how to improve it.
4. *Tracking progress*. An opportunity to determine the level of demand and support for an idea or a project, and investors can track the progress of the project. This may help to promote an idea through their networks and attract more investors.

5. *Possible better financing terms* due to the fact that P2P lending companies are able to run their businesses with lower overheads and provide cheaper services compared to traditional financing institutions.
6. *Increase of competition in the financial sector.* Overall, all non-bank financial institutions, including those that deal with crowdfunding, enhance competition within the financial services industry, which results in a decrease in the cost of services for consumers.

However, while the crowdfunding industry has its advantages, the industry has also some disadvantages, which include the following:

1. In most crowdfunding platforms, if the target amount is not reached, potential investors get a refund, the business gets nothing and all the time and money invested in the campaign is wasted.
2. It is not necessarily an easy journey. Crowdfunding may not be a successful way to get funded, given the fact that, as of now, the industry regulations are not established or tested.
3. The initial cost of starting the project may not be easy, as this will require some deliverables such as creating an attractive project page, making a compelling video, brainstorming rewards, reaching out to reporters and designating expenditure for management consultants, financial advisors and so on.
4. If the project is unsuccessful it will damage the reputation of the business and affect the credibility of the people entrusted to manage the business
5. It is critical to have suitable protection for an idea before showing it to the public. If a project is not protected by copyright, trademarks or patents, anyone can steal the business idea posted on the platform, especially if the idea is easily replicated.
6. Lawsuits arising from failed business ventures can occur.
7. Companies that issue shares through crowdfunding are obliged to numerous unsophisticated investors who own small stakes in their business. The result of this could deter angel investors or venture capitalists from investing in a company that is owned by hundreds or even thousands of inexperienced shareholders.
8. When investors invest via crowdfunding as opposed to banks, their contributions are not insured or guaranteed.
9. Although financial-market players in different jurisdictions are monitored by financial regulators or securities regulatory agencies, with crowdfunding the possibility of fraud always exist due to problems such as fake websites, fictional charities and Ponzi schemes (Sadzius and Sadzius 2017).

Crowdfunding market growth

The rapid growth of crowdfunding is generally attributed to two reasons: the 2008–2009 global financial crisis and the proliferation of the internet and social media.

The global financial crisis resulted in a number of bank failures and, consequently, the implementation of new capital adequacy regulations for banks, such as Basel III. Banks became more conservative in giving out loans to start-ups and small businesses due to higher risk. This has provoked a desperate need for new, alternative financing. Investment crowdfunding was one of these new ways of financing and provided an alternative way to raise capital (Sadzius and Sadzius 2017).

Globally, loan-based crowdfunding models account for the largest proportion of total market activity, around 90 per cent of the total market. The model also has the largest potential market size, with consumer and SME credit providing far more capital traditionally than equity or non-financial return-based models. Typically, loan-based crowdfunding is a regulated financial activity, either governed by existing regulation, as is the case in certain jurisdictions, or specific regulation that has been created purposely to regulate the new market activity. Equity-based crowdfunding, on the other hand, makes up the second-largest grouping of alternative finance models behind loan-based crowdfunding, with just under 10 per cent of the total global market. Given the typically higher risks associated with equity instruments as compared with loans, equity-based crowdfunding is typically regulated with an emphasis on restricting the types of investors that may participate, as well as the relatively strict disclosure, reporting, marketing and promotion rules (Ziegler et al. 2017).

The market has grown in developed countries, but is also slowly expanding in developing countries, from US$1 billion in 2011 to US$34 billion in 2015. North America is by far the largest market for crowdfunding, with an estimated fundraising volume of $17.2 billion in 2015. Asia is the second largest market, with $10.5 billion raised, while the European market trails with $6.5 billion of funding gathered. The crowdfunding market has also expanded from financing charities into enterprise financing and quickly surpassed angel investing to become one of the largest sources of financing for SMEs, second only to venture capital. The industry is expected to reach an annual volume of US$100 billion by 2025 and becoming the leading financial channel for SMEs.

In 2015, the UK was the third largest market in the world after the United States and China for alternative finance, with $4.2 billion raised that year. Of that amount, $3.15 billion accrued from loan-based models, while $0.44 billion was from equity-based models. Reward-based crowdfunding accounted for around $50 million, while Malaysia, as a leading market for Islamic finance, raised in 2015 a total of $3.36 million across the country. This was a substantial increase on the $1.03 million raised in 2014. Donation-based crowdfunding accounted for the majority of market activity, with over 92 per cent, and an additional 6 per cent coming from reward-based crowdfunding. In 2016, Malaysia was the first Muslim nation to issue regulation governing equity crowdfunding (ECF) where six equity platforms were licensed. It is worth noting that out of the six ECF platforms endorsed, only one of them, Ata Plus, seems to be originally rooted in Sharīʿah-compliant business; the other platforms are conventional ECF (Abdullah and Oseni 2017).

On the other hand, looking at the Islamic crowdfunding market and despite the existence of thousands of crowdfunds around the world, the number of those considering themselves to be Sharī'ah compliant is very limited. The Islamic Financial Services Board (IFSB) identifies five active Sharī'ah-compliant crowdfunding platforms with a primary location in a country of the Organisation of Islamic Cooperation (OIC): (1) equity loan platforms Liwwa (Lebanon); (2) Beehive (UAE); (3) Shekra (Egypt); (4) AtaPlus, a financing platform for small and medium enterprises in Malaysia; and (5) Danadidik, a crowdfunding platform for student loans in Indonesia (Islamic Financial Services Board 2017).

The IFSB report noted that some of the claims with regard to *Sharī'ah* compliance need improvements. For instance, it has found that one of the platforms did not mention the *Sharī'ah*- compliance nature of its activities clearly on its website but hinted at that as part of the list of activities in which a fund-seeking entrepreneur must not be involved. Another loan-based crowdfunding platform outlined the importance of Sharī'ah compliance and gave a brief explanation of its business model, which is primarily based on *murābaḥah* in the frequently asked questions (FAQ) section of its website. Another credit-based platform is applying a dual approach by offering both conventional as well as Sharī'ah-compliant financing. A fourth platform offers equity crowdfunding but did not explain how it ensures Sharī'ah compliance. Moreover, the platform operates as a "closed investors network", which is quite unusual for a crowdfunding platform according the IFSB report. The latest platform for student loans also claims to be Sharī'ah compliant and apply a profit-sharing model to calculate the returns for investors; however, it seems that such an ambiguous statement may not be enough and its Sharī'ah compliance is to some extent uncertain. The IFSB study concluded that none of the visited websites gives the full details of their contracts, admission criteria and measures to ensure Sharī'ah compliance. Thus, it is impossible for an observer to verify in-depth the Sharī'ah-related claims of the platforms and to understand their solutions or workarounds for Sharī'ah issues (Islamic Financial Services Board 2017).

Crowdfunding risks

Managing risk is a pivotal part of business success, particularly for start-up business. There is no doubt that starting a new business has its inherent risks; however, the determining factor will be how these risk factors can be managed and mitigated. Crowdfunding is embedded with various risks that require proper mitigation and management for the industry to systematically grow and develop.

According to the International Organization of Securities Commissions (IOSCO) (International Organization of Securities Commissions 2015), besides the common investment risks, such as conflict of interest, data protection and

fraud that can confront crowdfunding, there are additional risks that regulators should pay attention to. These risks include, among others, the following:

a. High risk of default or failure is often associated with start-up businesses and generally there is a lack of historical data for crowdfunding asset performance. In equity crowdfunding the risk of default/investment failure is estimated to be around 50 per cent. In P2P lending there has been a concerted effort by the industry to reduce default rates, though the actual rate of default is still unknown for some platforms. Already there has been a case of a P2P lending platform closing leaving no data on contracts behind and resulting in 100 per cent investment loss (Kirby and Worner 2014).
b. The risk of money laundering, terrorist financing and particularly the risk of fraud may be higher in the case of online private offerings, as is the case with crowdfunding. It is believed that the risk for fraud in crowdfunding is real, due to the nature of crowdfunding that appeals to less sophisticated investors who will invest in any project they think will be another success story. Typical crowdfunding investors would not have the requisite investment skills to determine whether an investment is real or a fraud, even with basic disclosure requirements for participation. It is also a fact that many fraudulent people are brilliant at presenting their investments to meet the very basic disclosures of crowdfunding. Therefore, some believe that while unintentional, crowdfunding is tailor-made to assist fraudsters in duping unsophisticated "investors" (Sullivan and Ma 2012).
c. The risk of platform failure or closure of crowdfunding portals is high, with a report revealing that in over 4,000 platforms globally, many have been shut down (Bijkerk 2014). Moreover, a recent study by the Cambridge Centre for Alternative Finance on crowdfunding in the western hemisphere shows that the "collapse of one or more well-known platforms due to malpractice" ranked second-highest in perceived risks to platforms, likely reflecting some of the repercussions of high-profile incidents within the industry. Sixty-nine percent of platforms viewed this as a medium to very high risk (Ziegler et al. 2017).
d. There is a problem of lack of liquidity, as in most cases there is no secondary market for crowdfunding shares or equity in particular, which would limit investors' ability to liquidate these shares.
e. The problem of information asymmetry is another genuine risk. A crowdfunding offering may not be suitable for all investors, due to lack of experience of many participants and, therefore, they may not be able to carry out sufficient due diligence.
f. Seventy-six per cent of platform operators believe there is medium to very high risk in the potential of a cyber-security breach, with 36 per cent of these platforms associating this factor with high to very high risk. This factor is viewed as the highest risk to individual companies (Garvey 2017).

g. Considering the fact that crowdfunding operates on web- or mobile-based platforms there is also the risk of cross-border implications, and regulators will definitely be taking this risk into account. To mitigate this risk, in particular it is suggested that special crowdfunding regimes should restrict cross-border fundraising by requiring that the issuer and/or the managers running the funding portal must be incorporated locally. This is also the trend at the moment in some Islamic finance jurisdictions. For instance, the Central Bank of Bahrain Sharī'ah-compliant Financing-Based Crowdfunding Directives states that "SCF Crowdfunding Platforms may only raise funds for fundraisers based in the Kingdom of Bahrain".

The IOSCO report on crowdfunding, while considering the fact that regulatory regimes for crowdfunding are still in their infancy, is requesting regulators and policy-makers to be more vigilant in order to better protect investors. Thus, some of the measures to be taken by regulators to address these inherent risks with regard to crowdfunding could include:

- customising entry, registration or licensing requirements for funding portals;
- setting disclosure requirements for issuers and funding portals;
- limiting the services that may be provided by crowdfunding platforms;
- requiring investor education and/or statements signed by investors acknowledging their understanding of risks;
- limiting the size of the investments made by an individual in each offering and in a given timeframe; and
- requiring the appointment of a third-party custodian to hold investor assets. (International Organization of Securities Commissions 2015)

Considering the risks associated with crowdfunding, such as fewe screening and monitoring efforts by the funders, non-existence of collateral and low reputation of the recipients, some researchers warned that naively applied crowdfunding opens doors for moral hazard and adverse selection behaviour among recipients, potentially implying that many of the projects being funded "are going to flop", and the subprime mortgage loans crisis serves as a critical reminder. This would suggest that crowdfunding, if not well regulated, would not be conforming to responsible finance principles (Winkler and Moslener 2015).

On the other hand, the use of internet is at the centre of crowdfunding as a new financing mechanism and, therefore, it may not be greatly serving developing and least-developed countries where internet penetration is still limited. Even if penetration and online networks reached levels comparable to advanced economies, crowdfunding is unlikely to flourish in many developing and least-developed countries, as platforms, recipients and funders are unlikely to make use of the new financing mechanism and enforce the very mechanisms of mitigating asymmetric information problems rejected in more traditional finance. However, without these mechanisms in place crowdfunding will not develop. The critics of

current crowdfunding maintain that at the current juncture the crowdfunding industry does not constitute a major field for development cooperation activities with regard to financial-sector promotion. It is acknowledged that while the industry should be monitored, in advanced countries as well as developing countries, the industry-positive impact is still limited to Western economies and China while crowdfunding in most developing countries might turn into a temporary phenomenon as a standalone business. It is widely acknowledged that "[c]rowdfunding is still largely a developed world phenomenon" (InfoDev 2013) and "the literature review highlights the fact that most of the lessons learnt on the initial applications of crowdfunding come from developed countries as it confirmed a 2016 Survey by the United Nations" (United Nations 2016).

The possible alternative and right approach to address this situation in developing countries is financial-institution building. This could include the possibility of enlarging the role for crowdfunding in developing countries and linking crowdfunding with banking, and thus the two sectors will become even stronger. Therefore, crowdfunding, after internet penetration has achieved a critical mass to complement financial development via banks, can provide a more sophisticated link between informal and formal finance than exists in developing countries today. Moreover, it is maintained that if crowdfunding platforms in developing countries were to develop, pilot projects involving donors, technical assistance providers and development finance institutions (DFIs) should be the next approach (United Nations 2016).

Crowdfunding regulations

Some regulators legalise equity and loan-based crowdfunding platforms as an intermediary, and therefore require registration and other regulatory requirements, depending on the jurisdiction. Generally, requirements relate to platform registration, but also include prescriptions relating to business conduct, governance and, in some cases, reporting requirements. Some others regulate platforms as if they were banks, due to their credit intermediation requirements. Such platforms therefore essentially need a banking licence and are subject to full disclosure and reporting requirements. In another group of jurisdictions, equity crowdfunding and loan-based crowdfunding are banned outright (Garvey 2017). However, things are rapidly changing globally.

The IOSCO Committee for the Regulation of Market Intermediaries carried out a fact-finding survey that covered 23 IOSCO members who participated in the survey with 2 main objectives: first, enhancing IOSCO's understanding of developments in member countries of the existing or proposed investment-based crowdfunding regulatory programmes and second, highlighting emerging trends and issues in this area.

The report noted that the jurisdictions surveyed reported a variety of approaches to regulate crowdfunding. Some jurisdictions apply their existing general securities regulatory framework, based on the assumption that these

regulations are broad and flexible to address crowdfunding regulatory issues. Other jurisdictions have either introduced or proposed to introduce specific regulatory crowdfunding regimes. The report highlighted that most regulatory regimes for crowdfunding are in the early stages of development, while the commonalities noted among these jurisdictions centre around the objective of achieving a balance between risks and investor-protection related concerns and the positive role security markets can play in supporting economic recovery and growth through the promotion of crowdfunding. The second common issue that comes out from the review is that restrictions may apply to cross-border crowdfunded fundraising and, therefore, special crowdfunding regulations often provide that the issuer and/or the managers running the crowdfunding must be incorporated locally.

The survey concluded that crowdfunding regimes are in their infancy in most jurisdictions surveyed and crowdfunding, particularly, appears to raise questions on virtually all aspects of securities markets regulation (International Organization of Securities Commissions 2015).

As noted earlier, crowdfunding has been regulated by a number of jurisdictions where Islamic finance is flourishing. For instance, the Securities Commission of Malaysia introduced *Guidelines on Regulation of Markets under Section 34 of the Capital Markets and Services Act 2007* on 10 February 2015. The Malaysian guidelines, which were introduced in order to accommodate equity crowdfunding, emphasised the general requirements for the issuance of securities, such as the need for registration, the appointment of a responsible person, reporting and disclosure requirements and the requirement that the Equity Crowdfunding operators monitor the issuers and investors for any misconduct, fundraising, investment limits, conduct of due diligence on issuers, anti-money laundering and investors education. However, what is important here is the fact that the Malaysian guidelines addressed the Sharī‘ah dimension too, making the submission of a Sharī‘ah advisory report a condition for the operation of these companies. However, it was observed that there is no dedicated part on Sharī‘ah compliance or specific Sharī‘ah screening methodology as required generally in Sharī‘ah-compliant investments (Hassan and Zainudin 2015). Moreover, a special feature of the Malaysian regulation is that it makes the appointment of a Sharī‘ah advisor by the platform operator mandatory when an Islamic capital market product is offered. The role and responsibility of the Sharī‘ah advisor includes:

1. Providing Sharī‘ah expertise and guidance on all matters, particularly in documentation, structuring and investment instruments;
2. Ensuring that the applicable Sharī‘ah rulings, principles and concepts endorsed by the Sharī‘ah Advisory Council are complied with;
3. Applying *ijtihad* (intellectual reasoning) to ensure that all aspects relating to the offering of Islamic capital market product are in compliance with Sharī‘ah, in the absence of any rulings, principles and concepts endorsed by the Sharī‘ah Advisory Council; and

4. Where applicable, issue a Sharī'ah pronouncement, which must include (i) the basis and rationale for the pronouncement; (ii) the structure and mechanism of the Islamic capital market product; and (iii) the applicable Sharī'ah rulings, principles and concepts used in the Islamic capital market product.

(Hassan and Zainudin 2015)

The Dubai Financial Services Authority (DFSA), the regulator of financial services and securities in the Dubai International Financial Centre (DIFC) free zone, introduced a regulatory framework for loan and investment-based crowdfunding platforms in August 2017. The DIFC's regulatory framework was the first regulatory regime for crowdfunding platforms in the GCC countries. It is reported that in developing the framework, the DFSA had benefited from the experience of countries such the United Kingdom, New Zealand, Singapore and the United States (Tarbuck and Osman 2018).

The aim of the DFSA's framework was to promote financial technology innovation, while providing certain protections for consumers. Among the protections that the framework aims at ensuring is the need to ensure that investors are provided with enough information in relation to the risks that they face by crowdfunding SMEs, such as: (i) the relatively high risk of capital loss; (ii) the lack of an immediate return, given the long-term nature of an early stage investment in SMEs; (iii) the lack of liquid markets in which the investor may dispose of their investments and therefore the lack of a clear exit route; and (iv) the potential for fraud, whereby an investor unwittingly funds a scam pitch (Tarbuck and Osman 2018).

The draft of the DFSA requires a platform that wishes to be Sharī'ah-compliant to get an Islamic endorsement (by the DFSA) and have to comply with the Islamic Finance Rules (IFR) which specify the Sharī'ah governance arrangements required. With regard to the appointment of the Sharī'ah Board, the draft regulations noted that:

> we are aware that the standard Sharī'ah governance arrangements required in IFR, specifically relating to the appointment of a Sharī'ah Supervisory Board, could be problematic, for example due to the cost of appointing a Board, for operators of loan-based crowdfunding platforms.
>
> *(Dubai Financial Services Authority 2017)*

However, it is clear that such a broad and inconclusive statement may not create the conducive environment for the development of Sharī'ah-compliant crowdfunding. It is worth noting that the DFSA's regulations did not propose a separate Islamic framework as is the case with the Bahraini regulations and this may not be compatible with the aim of becoming the centre of Islamic finance and halal economy.

The Central Bank of Bahrain (CBB) also released the Bahraini regulations for crowdfunding in August 2017. Unlike the DFSA, the Bahraini regulations

cover both conventional and Sharī'ah-compliant financing-based crowdfunding businesses separately. It is believed that this step will make it possible for SME businesses in Bahrain and in the region to raise conventional or Sharī'ah-compliant financing through crowdfunding. The directives in the regulations were clear that firms operating an electronic financing/lending platform must be licensed in Bahrain under the CBB Rulebook Volume 5 – Financing-Based Crowdfunding Platform Operator. The general regulations are the same for both conventional and Sharī'ah-compliant financing-based crowdfunding platforms except for the fact that the latter has an additional requirement which is to ensure that the financing structure is Sharī'ah-compliant by engaging a Sharī'ah advisor or outsourcing this function to a third party.

It is worth noting that the Bahraini regulations note that the role of conventional financing-based crowdfunding (CFC) platform operators is restricted to arranging deals, bringing together borrowers and lenders. The CFC platform operators are strictly prohibited to provide any advice on deals. A CFC platform operator itself may lend money to borrowers, who use the platform subject to:

1. Obtaining the required license from the CBB for carrying financial services of providing credit; and
2. Adequate disclosure of the conflicts of interest which will arise for each transaction on their website.

The CFC platform operators must make arrangements with a local retail bank (which holds the appropriate CBB license) to facilitate transactions. Also:

1. Lenders must prefund the full committed amount by depositing it at the designated licensed retail bank in Bahrain. The name of the retail bank must be disclosed to the CBB.
2. The CFC platform operator must designate an escrow account as an aggregate account for all borrowers. The CFC platform operator must maintain within its records separate sub-accounts for each borrower. The name of the designated bank must be provided to the lenders (Kumar 2017).

Turkey has also passed legislation to regulate crowdfunding. The law was passed on 5 December 2017, which amended Capital Markets Code No. 6362 ("CM Code"). However, the CM Code explicitly states that crowdfunding is not to be considered an investment activity for the purposes of the CM Code and other relevant Turkish Capital Markets Board (CMB) legislation. Therefore, while it is under the supervision of the CMB, crowdfunding will not be subject to the more costly and time-consuming processes of public offerings or the issuance of debt instruments (Basol 2017).

Although regulations pertaining to crowdfunding are in their early stage of development and vary from one country to another, however, it is pertinent to note that one of the top priorities in this process is the development of

financial-market regulatory institutions, since well thought-out regulations and supervision are the cornerstones of a stable financial sector. Crowdfunding regulations took a while to emerge in various jurisdictions and in some are still in the making because of the difficult process of reconciling technological innovation and potential business risks and how best to serve the need of platforms operators, investors and the wider economy (Sadzius and Sadzius 2017).

However, despite these regulations on equity crowdfunding, many have their reservations about the practical operation of equity crowdfunding. The following are some of the reasons.

1. It is believed that the risk for fraud in crowdfunding is still real because, by its nature, crowdfunding appeals to a less sophisticated investor base who will invest in any project they think will be the next Facebook. Even investors with basic disclosure requirements for participation would not have the investment know-how to determine whether an investment is real or a fraud. After all, many fraudsters are brilliant at presenting their investments on paper to meet the very basic disclosures of crowdfunding. Therefore, some believe that, while unintentional, crowdfunding is tailor-made to assist fraudsters in duping unsophisticated "investors".
2. On the other hand, even if the current regulations are good steps and can be considered as an attempt to avert fraud and increase the amount of disclosures, the individual investment contributions in crowdfunding are generally too small for law-enforcement authorities to expend resources to investigate or for attorneys to take on a fraud lawsuit, unless of course a contingency business litigator can bring a class action (Sullivan and Ma 2012).
3. Crowdfunding reveals a system fraught with peril that will likely lead to an increase in litigation particularly in the case of the inability to recover anything from the losing crowdfunding entity. It is pertinent that crowdfunding losers are protected by regulators in such a situation.
4. Entrepreneurs who use crowdfunding, particularly early stage entrepreneurs, might also face the risk associated with crowdfunding by putting their ideas at risk of being stolen by better-funded investors or large corporation. This will raise the issue of copyright and patent right.
5. Many crowdfunding investors are just seeking a "get rich quick" scheme.

Taking into consideration the risk associated with crowdfunding some are suggesting linking it with the banking industry to minimise the risks of crowdfunding and opening banks to the technological revolution. It is believed that crowdfunding could provide a new channel for banks to cater to riskier enterprises which are not currently eligible for funding, as a way to adapt to the digital environment.

Despite the fact that the banking industry has adopted, so far, a wait-and-see approach towards crowdfunding, it is slowly entering the industry by either their own platforms or through partnerships with existing platforms. Banks are slowly

beginning to realise that in addition to the business potential of crowdfunding, the industry might pose a serious threat to the conventional financial services business. However, any integration will depend on regulation, which in several countries is slowly adjusting to the changing operational environment.

The integration could take the form of a syndicated approach that will provide equity crowdfunding in the banking industry. A dedicated model of cooperation between banks, venture capital funds and crowd investors could possibly alleviate the transaction costs for banks, while reducing the prevalence of asymmetric information for investors, as the vetting would be performed by venture capital experts of this field (Setälä 2017).

It is believed that despite the information about founders and their ventures provided on crowdfunding platforms, information problems persist. The internet does not facilitate the transmission of certain types of information that require face-to-face interaction such as how to assess the founding team in terms of their grit, determination, interpersonal dynamics and trustworthiness.

The first wave of equity crowdfunding platforms was able to communicate key elements of their business plan to a wide audience of accredited investors in a manner that was standardised and efficient and enabled accredited investors to invest relatively small amounts of capital in a cost-efficient manner. In other words, these platforms enabled investors to both learn about investment opportunities and execute transactions, expanding the addressable market for early-stage capital. However, the problem of information asymmetry persists. Although investors could now make early-stage investments at a much lower cost, they had limited incentive to do so because they still faced a high cost of conducting due diligence (Agrawal et al. 2016).

Conclusion

It is clear from the analysis made earlier on investment crowdfunding, namely debt- and equity-based crowdfunding, that the new business model can be adopted in Islamic finance. However, enormous challenges lie ahead. Besides the broader challenges facing crowdfunding in general, such as risks and legal challenges, there are also the operational issues related to governance and Sharīʿah compliance challenges. This is premised on the fact that Islamic finance transactions are based on the exchange of goods and services rather than mere lending with interest. Therefore, there is a need to ascertain that there is a real exchange of goods and services that fulfil all the conditions required in a sale or *ijārah* contracts as they are currently used in the banking sector. For instance, there is a need for an organised market for commodity *murābaḥah* that will facilitate the implementation of a genuine *tawarruq* that will involve buyer, seller and brokers and genuine constructive taking of possession in all these transactions. The institution of a Sharīʿah board or an advisory panel having not only the Sharīʿah and Islamic finance expertise but also exposed to the hardwired challenges of using the internet as the mean of transaction is a must.

On the other hand, and given the enormous risks facing crowdfunding that is restricting its growth and curtailing its expansion and the fact that many regulators are keenly interested in regulating crowdfunding but with strict rules that keep it close to the banking and capital market activities, the suggestion of linking crowdfunding to the banking industry, particularly microfinance in the Islamic finance industry, is worth taking.

The nature of crowdfunding and available empirical findings show that networks and social capital play a critical role in the crowdfunding process. Start-up companies are leveraging on an array of network and "ties", as is the case in most Western countries and China where the crowdfunding sector is growing rapidly and the standard of living is high. The question is therefore whether the sector will be viable in Muslim countries where poverty is rampant, besides there being weak networks and ties (Brown et al. 2016). This concern is also emphasised by the fact that crowdfunding is largely still an unregulated activity, particularly in Muslim countries where Islamic finance is flourishing, and cross-border crowdfunding regulations are almost inexistent. Thus, although funds are raised through the internet, it is limited by national regulations and boundaries. These limitations could seriously affect crowdfunding's capacity to reduce the funding gap for start-ups and SMEs across borders (Borello and De Crescenzo 2015).

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PART IV

Legal and regulatory issues

11

THE REGULATION OF FINTECH AND CRYPTOCURRENCIES

Nafis Alam and Abdolhossein Zameni

Introduction

Fintech is the buzz word in today's financial industry landscape. In simple terms, it is a combination of the words "finance" and "technology" to provide a better and innovative financial technology infrastructure for offering financial products and services (Puschmann, 2017; Schueffel, 2016). It is common to associate fintech with mobile-app-related solutions, but it is beyond that, i.e. it encompasses the whole spectrum of digitalisation of financial services with innovation. It has revolutionised the offering of financial products and services by making it affordable, easier and user-friendly in comparison to traditional offerings. At the same time, the increased use of financial technology (fintech) and digital currency is calling for an enhanced regulatory landscape to protect both users and providers of these services.

It has been well argued by both practitioners and regulators that cryptocurrencies and blockchain (the technology behind most fintech) have the potential to positively contribute to consumer experience, reduced cost of financial services and economic development. The application of fintech has also shown potential to provide better, cheaper and more convenient services, especially for the poor in developing countries, which is in line with the aspirations of Islamic finance. Specifically, blockchain technology can be effectively used to provide financial services to the unbanked population and can be used as an effective tool for financial inclusion, especially in the developing and underdeveloped economies. Nevertheless, regulators are concerned that the wide use of fintech and the inability to track the use of digital currency might lead to risks which need to be addressed appropriately. Some of the known drawbacks of these technological innovations have the potential for money laundering, terrorist financing and cybercrimes, as well as tax fraud. There is the absence of reliable regulatory

structures to deal with the changing financial landscape and limited capacity of regulators to deal with financial crimes within new technology and the legal uncertainty surrounding the new applications of blockchain and cryptocurrency.

Regulators across the globe, from Japan to the United States to Australia, are keen to keep pace with developments to ensure that existing laws are enforced to prevent illegal activity, such as money-laundering and financial crimes. Various countries are also enacting new laws to address the changing fintech and cryptocurrency landscape. The importance of regulating the fintech and digital currency landscape led to its consideration as one of the main agenda items for the G20 summit held at the beginning of 2017. The same sentiment was echoed during the G7 summit held in Quebec, Canada, where the leaders of the G7 nations endeavoured to promote safety and data security, protect personal privacy and establish transparency.[1]

This chapter will provide an insight into the potential usage of fintech in the banking landscape and issues faced by bankers and regulators in regulating the usage of fintech and cryptocurrency, and what the potential areas are where the technology can be misused. The chapter will consider how the regulation of technology (Regtech) usage in the financial services landscape is important to avoiding financial crime. The chapter will provide case studies from countries such as Australia, the United States, the United Kingdom and Japan, who are taking a lead in regulating fintech and digital currency usage. The chapter will also provide an example from Malaysia to demonstrate how a central bank is taking the lead by issuing a fintech regulatory sandbox.

Fintech and its role in financial services

Fintech describes financial services using innovative or disruptive technology to enhance customer's experience. According to Christensen (1997), a disruptive technology is a new emerging technology that unexpectedly displaces an established one. The global crisis of 2008 was a trigger for fintech to evolve and disrupt the traditional commerce, payments, investments, asset management, insurance, clearance and securities' settlement and even money by the emergence of bitcoin.

Fintech is a phenomenon echoed by the World Wide Web and mobile internet revolution (Surendra, 2017). Fintech, by combining software and technology, delivers financial services and products to consumers. These services and products could be in the areas of banking, insurance, investing, practically anything that relates to the finance industry. In reality, fintech has transformed the consumer's experience in different ways. Some tangible examples in our daily life include internet money-transfer services provided by banks, financial services offered by start-ups at a lower cost through the internet, alternative payment channels provided by technology companies, insurance, investment industries, digital wallet, etc.

In spite of the disruptive nature of fintech, there are several potential benefits which cannot be ignored. Speed and convenience, greater choice, cheaper deals

and more personalised products are just some of the benefits that consumers are experiencing from fintech which make their interactions and transactions much more efficient and easier. As usual, there are always two sides involved in any financial services: return and risk. It means there are some potential risks in the use of fintech in the finance industry, which are: unclear rights, making a rash decision, technology-based risks, financial exclusion, etc.

Fintech can act as a disruptor to the current financial ecosystem. For example, in-person shopping is being replaced by the growth of online shopping, which is moving towards cashless solutions for transactions, big-data analytics to uncover the aggregated market view, replacement of humans with artificial intelligence in financial services (robo-advisors), transaction process improvements, opportunity for marketplace lenders (fintech providers) to provide solutions to financial service providers, etc.

Nevertheless, banks want to keep their dominance in the financial industry and enjoy it as they have been for centuries. However, if banks still intend to be dominant in the finance industry and retain their current luxury, all they need is radical change and an overhaul of their current services. On the other hand, banks have also become technology providers, competing with international payment system companies, such as PayPal or Square, and sometimes collaborating on rolling out shared platforms to enable services. Therefore, it now appears that the banking industry is disrupting the fintech industry – its old rival. It means that disruptors are now being disrupted. From the banks' point of view, fintech affects almost all areas of financial services, including borrowing/lending, payment and transfer, fundraising, trading, insurance and risk management (Tan, 2017). If banks fail to enhance their services to offer a personalised, best-in-class product experience, they will be downgraded to supplying the engine for technology companies in ten years' time.

This paradigm shift is happening because new fintech start-ups are small and they lack track record and capitalisation. They also lack reputation of security, agility and the ability to navigate complex regulations. One of the advantages of most fintech start-ups is that during turbulence they remain resilient and firm. Bank and financial industries are experiencing a severe drift in technology, e.g. blockchain, shared ledger, etc. Previously, finance was seen as an extremely technical, sophisticated, very complex system, beyond the understanding of ordinary users, except for a few firms or individuals, as a vastly regulated and controlled industry conquered by banks that resist disruptive technologies; but now finance is riding an entrepreneurial wave.

The financial crisis of 2008 was a huge shock to the financial industry, particularly the banks. Worldwide, regulators noticed that the whole financial ecosystem needs an overhaul. Therefore, for example in the United States, they came up with the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 which was the biggest oversight after the great depression of 1930. It is obvious that the finance industry has no resistance against fintech; therefore, the government of each country, or some of the international financial

authorities and regulators, need to support a fintech system by addressing consumer protection issues and also encouraging competition in the marketplace. However, as each coin has two sides, there could be a fall-back by regulators. If the regulatory bodies are not independent enough or they cannot see the future and benefits of fintech, the regulatory environment could become less favourable to fintech firms. This indicates that if regulations are favourable to either traditional financial services firms or fintech firms, the balance of growth could change immensely. Interestingly, fintech can manage our money automatically for betterment or wealth front and not pay for investment advice that may or may not outperform the market (Sharma, 2016). Fintech has facilitated and pushed cryptocurrencies to the stage where it has reformed the way people financially transact. In fact, industry experts and analysts develop and implement international trade and investment and export promotion strategies that strengthen the international competitiveness of the finctech industry.

If fintech companies intend to succeed and penetrate into the highly competitive financial markets, they need to have a proper and valid business model. Their model should guarantee results and increase the productivity, predictability, scalability, replicability and reliability of the business modeling and transformation. In order to come up with a proper and valid business model, fintech firms should do an in-depth quantitative and qualitative analysis of industry relationships and try to relate to people in order to inspire and motivate them.

As many industries in different countries are witnessing the inevitable waves of fintech, instead of avoiding and resisting it, they already have started to embrace it. For instance, Malaysian banks are quick to point out that fintech disrupts businesses; therefore, they are embracing the movement either by coming up with their own fintech innovations or working with fintech start-ups (Fong, 2017). Equity crowdfunding (ECF) is one the examples of fintech. Other areas of fintech that the three largest Malaysian banks (CIMB bank, RHB bank and Maybank) are focusing on are loyalty and rewards, identity, security and document management using block chain, remittances, mobile payments, P2P, digital wallets, lending, distributed database (blockchain), asset management, humanising financial services (financial inclusion), security, internet-of-things (IoT), Islamic finance and big data (Fong, 2017).

In line with financial innovation, many capital market regulators have started licensing alternative financing and lending platforms. One such example is the Securities Commission of Malaysia, which in 2015, approved six ECF operators to provide alternative funding platforms for small businesses and entrepreneurs (Lee, 2015). The Securities Commission of Malaysia also launched aFINITY@ SC, a fintech community that serves as a hub for networking and education. In addition, the Securities Commission of Malaysia amended its guidelines and published a regulatory framework for P2P lending, permitting small and medium-sized firms to have access to debt funding (Securities Commission Malaysia, 2016); while the Dubai Financial Services Authority (DFSA) has also launched a regulatory framework for loan and investment based crowdfunding platforms.

These crowdfunding platforms can act as a substitute for banks. Banks can send to the P2P platforms those customers whose risk profile is not within their limits, while the platforms can promote other banking services that do not compete with its service (an account or treasury services, for instance). Other collaboration opportunities could exist in the area of sharing risks between the bank and the platform, with the first covering a portion of the funding through collective investments, for instance for projects in corporate social responsibility, or of a marked social nature.

Cryptocurrencies and distributed ledger technology

Cryptocurrency is a form of digital money that is designed to be secure and, in many cases, anonymous. It is a currency associated with the internet that uses cryptography, the process of converting legible information into an almost uncrackable code, to track purchases and transfers. Cryptography is used to secure the transactions and to control the creation of new coins. The first cryptocurrency to be created was bitcoin back in 2009. Today there are hundreds of other cryptocurrencies, often referred to as altcoins.

Regarding the cryptocurrencies, bitcoin is one of the digital currencies among many others which have pioneered a new approach to tracking financial transactions. The underlying technology of digital currencies is called blockchain. Blockchain can record every transaction made in that currency in identical copies of a digital ledger that is shared among the currency's users (Trautman, 2016).

The essential difference between bitcoin and earlier currencies is that bitcoins can be owned by any individual, without permission from any bank or government (Yeoh, 2017). In addition, bitcoin can be sent to anybody else in the world who knows how to work with a "bitcoin wallet" (Yeoh, 2017). The essential breakthrough of bitcoin is its principle of "censorship resistance" (Swan, 2015) which is the main concern of lawmakers and regulators. On the other hand, banks keep track of customer balances on a ledger. Bitcoin also uses a ledger, but it is maintained collaboratively by the decentralised network of computers and is known as a distributed/shared ledger (Yeoh, 2017). By expansion of the fintech ecosystem, usage of the distributed ledger is getting wider. Financial institutions, regulators, central banks and governments are now exploring the possibilities of using this distributed ledger methodology both in government and the wider economy (Yeoh, 2017).

Central banks and government finance departments of different countries are studying digital cryptocurrencies, as electronic distribution of digital cash brings in potential efficiencies. Digital currency, unlike physical cash, uses a ledger of transactions that is absent from physical cash (Walport, 2015). The main message is that, by understanding the technology, governments and the private sector can choose the design that best fits a particular purpose, balancing security and central control with the convenience and opportunity of sharing data between institutions and individuals. In order to meet the goal, the civil service (government) and the legislators should collaborate closely.

Fintech regulation across the globe

Fintech powered by blockchain technology has huge importance for the financial services industry and can come in handy to solve problems such as delays, cost, duplication and reconciliation. Some of the important properties of blockchain technologies are: 1) reconciliation through cryptography, 2) replicated to many institutions, 3) granular access control and 4) granular transparency and privacy (Walport, 2015). In a nutshell, financial institutions using blockchain technologies can help to reduce fraud, corruption, error and the cost of paper-intensive processes. It has the potential to redefine the relationship between government and the citizen in terms of data sharing, transparency and trust (Filippi and Loveluck, 2016). But, on the other hand, one of the main challenges of blockchain is how to communicate its importance to policymakers and the public.

In fact, there are many unresolved issues in the adoption process of blockchain, distributed ledger and related financial technologies. The government has a significant role to play in designing security and privacy in the fintech industry. In fact, the government needs to work closely with academia and industry in order to ensure standards are set for the integrity, security and privacy of distributed ledgers and their contents (Palmer, 2016). These standards should be incorporated in both regulatory and software code.

Besides the integrity of the ledger, another area that is important and needs to be taken care of is privacy and confidentiality of the ledgers. Ledgers do not necessarily just keep the financial data of the customers but may hold personal confidential records that could range from familial to health. Effective governance and regulation are key to the successful implementation of distributed ledgers (Yeoh, 2017). In the case of the digital world, there are two sets of rules or codes that control the operation of digital technologies; one is the legislative framework, the code of law and regulation and the second is the set of rules that determine the operation of the algorithms encoded by the software (Kroll et al., 2013).

Successful implementation of a distributed ledger will require a combination of governance to protect the participants and stakeholders and regulation to ensure the system is resilient to systemic risk or criminal activity. Determining the best balance between governance and regulation, and between legal code and technical code, is going to involve unusual combinations of skills, including the need for lawyers, mathematicians and computer experts to work together to resolve many of the key issues (Lessig, 2006).

Jurisdictions across the globe have started to promote and regulate the fintech sector. An increasing number of regions are joining the trend to create regulatory sandboxes in order to speed up innovation in their business sectors and turn themselves into international hubs. But what characteristics should a place have in order to become a fintech pioneer? One of the most significant factors, according to a report by Deloitte (2017) that analyses 44 key cities in the world fintech ecosystem, is regulation. The report includes regulatory initiatives as one of the

six indicators that determine the city's Index Performance Score, which shows its importance as an international fintech hub, within the global context.

The highest-rated cities as regards regulation are London, Abu Dhabi, Luxembourg, Mexico City and Singapore. Three of them are within the group of eight countries in the world that have their own regulatory sandboxes in operation: United Arab Emirates (Abu Dhabi), the United Kingdom, Singapore, Netherland, Malaysia, Australia, Canada and Hong Kong. The sandboxes are platforms provided by the regulatory agencies to offer a space to firms to experiment with new business models that currently do not have a legal framework. The objective is to accelerate the arrival to the market of projects with demonstrated feasibility. The first country to put one into operation was the United Kingdom, which has already started its second round of companies. Apart from the abovementioned countires, as of 31 May 2018, Denmark, Russia, Brunei, Indonesia, Thailand, Mauritius, Bahrain, Saudi Arabia, Jordan, Switzerland and Sierra Leone have also established regulatory sandboxes; while in the United States, Arizona became the first state to enact a fintech regulatory sandbox. Arizona's sandbox will allow start-ups, entrepreneurs and even established companies to launch products on a limited, temporary scale to consumers to test innovative products, services, business models and delivery mechanisms in the real market without incurring the regulatory costs and burdens that would otherwise be imposed.

The Netherlands

This is one of the strongest entrepreneurial ecosystems in Europe, where investments grow at a rapid pace and regulators are accessible to fintech companies. The regulatory sandbox was launched on 1 January 2017 by the Authority for the Financial Markets (AFM) and De Nederlandsche Bank (DNB) and remains open to companies.

United Arab Emirates

The creation of its RegLab (regulatory laboratory) by Abu Dhabi Global Market (ADGM) marked a milestone as it was the first in the Middle East and North African (MENA) region. It was opened in November 2016 and its first graduating class included robo-advisors, big data, crowdfunding and digital banking companies; while the Dubai Financial Services Authority (DFSA) started its Innovation Testing License (ITL) in January 2017, which is similar to ADGM's RegLab.

Canada

The Canadian Securities Administration (CSA) launched its regulatory sandbox in February 2017. It was an important step for a country where large amounts

of risk-capital investment and the rapid arrival of multinationals are turning Toronto into an important reference point for fintech in North America. The CSA sandbox initiative is considering business models including online crowdfunding and lending portals, artificial intelligence for trades or recommendations and cryptocurrency or distributed ledger technology-based ventures

United Kingdom

The United Kingdom has been a pioneer in the use of accelerators and sandboxes as part of the regulatory process. Its Financial Conduct Authority (FCA), as part of its broader Project Innovate, launched the first fintech regulatory sandbox in June 2016. After its first year of operation, 90 per cent of firms that completed testing in its first cohort were continuing towards a wider market launch, and more than 40 per cent received investment during or following their sandbox tests.

Malaysia

Different regulatory agencies joined forces to promote fintech by opening a regulatory sandbox in October 2016. Thanks to the support of the authorities and a young population disposed to adopting the technology, Kuala Lumpur has the potential to become the fintech center of Southeast Asia.

Australia

The country's regulator was the first in the world to create regulatory expectations for fintech in December 2016, when it launched its regulatory sandbox. In May 2017, a regulatory "hackathon" was proposed, as was a new regulatory framework for the "Regtech" industry.

Singapore

In March 2017, the Singapore Fintech Association (SFA) opened its regulatory sandbox, to accelerate the fintech innovation within the country and also to foster international collaboration. In addition, the organisation created an online dictionary for fintech companies (similar to Crunchbase) that already has 300 companies and which it hopes will help the different agents in the sector to find financing and talent. To date, Singapore has the greatest number of regulatory collaborations, having signed co-operation agreements with eight countries, namely the UK, South Korea, India, Switzerland, Australia, Abu Dhabi, Japan and France.

Hong Kong

The Hong Kong Securities and Futures Commission (SFC) launched a regulatory sandbox on 29 September 2016. The sandbox provided a confined regulatory

environment for qualified firms to operate regulated activities under the Hong Kong Securities and Futures Ordinance (SFO) before fintech is used on a fuller scale to the wider public. In addition, the fintech career accelerator scheme was created, a programme designed to cover the need for talents in the Fintech space in the region.

Indonesia

In January 2018, the Indonesian central bank, Bank Indonesia, introduced its fintech sandbox which allowed fintech players to test their services for six months under the regulatory eyes of the central bank. While the Financial Services Authority, or Otoritas Jasa Keuangan (OJK), issued a new regulation on financial digital innovation in financial services, namely, "POJK", an OJK version of regulatory sandbox.

Bahrain

In June 2017, the Central Bank of Bahrain (CBB) introduced a regulatory sandbox aimed at enabling firms to test and develop their products in a virtual space. The introduction of the regime positions the Kingdom of Bahrain as only the second state within the Gulf Cooperation Council to implement such a framework.

The legality of bitcoin under different regulatory environments

An uncertain regulatory environment makes it difficult to operate and use cryptocurrencies in many jurisdictions. Furthermore, the lack of regulatory framework hampers product development and service provision in cryptocurrencies, as the uncertainty makes such an endeavour high-risk. The lack of regulation surrounding virtual currencies in some jurisdictions increases the potential of crypto being used for darknet activities, tax evasion, money laundering and terrorist financing. Cryptocurrencies in general pose a challenge to regulators, as virtual currencies combine the properties of currencies, commodities and payment systems. There is a dispute on the legality of cryptocurrency, especially bitcoin, in the world. However, some countries still make the usage of bitcoin legal but they do not have any defined regulation for it, whereas some countries like Bangladesh, Bolivia, Ecuador, Kyrgyzstan and Nepal have made the usage of it illegal as a currency or commodity. The European Union does not have specific legislation relating to the status of the bitcoin as a currency but have stated that Value Added Tax (VAT) and Goods and Services Tax (GST) are not applicable to the conversion between traditional (fiat) currency and bitcoin. However, VAT/GST and other taxes (such as income tax) still apply to transactions made using bitcoins for goods and services (The Law Library of Congress, 2014). In this regard, Europe's highest court, the European Court of Justice, ruled that

purchasing and selling bitcoin must not incur sales tax since bitcoin transactions are similar in nature to those of other "currency, bank notes and coins used as legal tender".

In 2016 the European Parliament's proposal to set up a taskforce to monitor virtual currencies to combat money laundering and terrorism, passed by 542 votes to 51, with 11 abstentions, was sent to the European Commission for consideration (News European Parliament, 2016). The European Commission also offered a "parallel" proposal aimed at stopping tax evasion practices as discovered in the Panama Papers (del Castillo, 2016). In 2017 it was publicised that the proposal will involve cryptocurrency exchanges and cryptocurrency wallets to recognise doubtful activity (Coleman, 2017).

Previously, some African countries like Algeria, Nigeria, South Africa, Namibia and Zimbabwe did not have a clear stand regarding the legality of the bitcoin. But, recently in 2017, the Central Bank of Nigeria (CBN) and Bank of Namibia have passed a circular to advise their banks that bank transactions in bitcoin and other virtual currencies have been banned, and that bitcoin cannot be accepted as means of payment for goods and services in Nigeria and Namibia (Opeyemi, 2017; Bank of Namibia, 2017).

On the other hand, North American countries like Canada, the US and Mexico have a clear stand on the regulations pertaining to the usage and legality of the bitcoin (Sandra Appel, 2014; IRS, 2014). In these three countries, usage of the bitcoin is legal. For example, Mexico made it legal as of 2017. Furthermore, Chicago Mercantile Exchange, the world's largest options and futures exchange launched bitcoin trading in December 2017 (Sedgwick, 2017).

Interestingly, the legality of bitcoin in South American countries is disputable. For example, Argentina, Brazil, Chile and Colombia have not announced that usage of the bitcoin is illegal but they have emphasised that it is not regulated (The Law Library of Congress, 2014), whereas Bolivia and Ecuador have issued a ban on bitcoin and other digital currencies (Anthony Cuthbertson, 2014).

In Asia, especially in the Middle East, the governments of Israel, Saudi Arabia, Jordan and Lebanon have not declared the usage of bitcoin or any cryptocurrency illegal, but they have issued a warning discouraging the use of cryptocurrency as it is not regulated yet. The Saudi Arabian Monetary Authority (SAMA), in July 2017, warned people using cryptocurrency, as it is high-risk, and also mentioned that dealers of the cryptocurrency will not have any protection or rights.

Bangladesh in 2014 and Nepal in 2017 declared bitcoin as illegal. Bangladesh Bank mentioned, "anybody caught using the virtual currency could be jailed under the country's strict anti-money laundering laws" (AFP, 2014). In addition, Nepal also mentioned that using virtual currency could have severe consequences (Sanzblog, 2017). India and Pakistan have not regulated bitcoin. Their reasoning is that cryptocurrencies could be used for tax evasion and money laundering (Zeb Khan, 2017).

East Asian countries like China, Hong Kong, Japan, South Korea and Taiwan have not announced the bitcoin as an illegal currency; although, in the case of

Japan, they legitimately recognise bitcoin and other sorts of digital currencies as a "means of payment that is not a legal currency" (Smart, 2016). In fact, the city of Hirosaki has officially accepted bitcoin donations with the purpose of attracting international tourists and financing local projects (Parker, 2017b). In 2017, Japan's government announced that bitcoin could be used as a method of payment (Parker, 2017a).

Countries in other regions of the world, like Southeast Asia, Central Europe, Eastern Europe, Northern Europe, Southern Europe, Western Europe, Australia and New Zealand, have not announced usage of cryptocurrency as illegal. Turkey has announced that bitcoin is not regulated as it is not considered electronic money by law (BDDK, 2013). Australia, on 1 July 2017, officially announced that it will consider bitcoin just like money and it will no longer be subject to double taxation (Suberg, 2017).

The Islamic perspective on cryptocurrency

Though the Islamic jurisprudential perspectives on currency and cryptocurrencies, particularly bitcoin, have been extensively discussed in Chapter 9, there is a need to provide some cursory comments here. As the world is embracing the new form of currency – cryptocurrency – there has been a lot of speculation regarding the legality of cryptocurrency from the Islamic perspective. Sharī'ah requires any form of currency to have an intrinsic value. The value of a currency must be backed up by an asset or tied to a commodity of actual value, and can also be shown by the difficulty of attaining it. To be accepted as a form of currency, Sharī'ah also requires a currency to be tangible or to have an evidence of existence. If we focus on the Sharī'ah injunctions on money, Ibn Taymiyyah (1998) states that the physical body of money is never the objective of acquiring money, rather, it is the counter-exchange which is the objective and benefit of money. He further emphasised that when currencies and money are intertraded with the intention of investment and profit, it opposes the very purpose of money.

Sharī'ah scholars are divided on their opinions regarding the legality of cryptocurrency such as bitcoin. One school of thought argues that cryptocurrencies such as bitcoin are not a form of currency since they are just numbers with digital entries on a cryptic blockchain. They have no intrinsic value at all. Bitcoin is a digital entry which is fluctuating in value due to pure speculation and there is no real substance or underlying asset backing the value of the bitcoin. This can result in cryptocurrencies being non-Sharī'ah-compliant and a form of gambling and speculation. On the other hand, for those who consider bitcoin as valuable, they do so considering it is as something of economic value and being storable and retrievable. According to this school of thought, bitcoin will be treated as a digital asset and does not require any physical asset to back its value.

On the issue of bitcoin's position from a Sharī'ah perspective, Mohammad Mahmoud Ibrahim Tayel argued that bitcoin lacks one quality that money

should have – public confidence, as evidenced in its volatile nature. He categorically noted that:

> If we assumed that Bitcoin is analogous to the gold and its precise cause is its moneyness, then definitely Bitcoin is not eligible to resemble gold/silver in cyberspace on basis of a mere limitation or deflationary nature, especially that these two features have not established the precise cause which is the public confidence, but rather created an injury for the holder and the users alike due to high volatility.
>
> *(CoinGecko, 2017)*

According to Team Luno (2016), while Rodney Wilson is of the view that "there are no Sharī'ah objections to bitcoins for payments and receipts", he added that it is not advisable for those who are not financially literate. He emphasised that, "The principle of risk sharing is fundamental to Islamic finance, but investors need to understand exactly what risks they are sharing" (Team Luno, 2016). In 2014, the Malaysian Fatwa Council, Malaysia's religious governing council that gives rulings on what is and is not *halal* (permissible), also released a statement cautioning against the use of bitcoin as a currency due to its volatile nature, which gives rise to price speculation, and the lack of an authoritative central body.

Even though there is no clear consensus on the legality of bitcoin under the Sharī'ah, there is a growing usage of blockchain technology in Sharī'ah-compliant activities. For instance, in Indonesia, microfinance start-up Blossom Finance uses bitcoin to transfer crowdsourced investments to small and medium-sized enterprises in need of capital. In addition to the cost-saving factor, Blossom finance is built on the *halal* risk-sharing factor, since it is crowdsourced and profits are shared through investment ratios. Canada-Based GoldMoney was certified *halal* during early 2017 for its gold-based financial services. It utilises blockchain technology to facilitate its financial transactions, while Malaysian company HelloGold also utilises blockchain technology in its Sharī'ah-compliant gold-trading platform to minimise costs and reduce processing delays.

Conclusion: What lies ahead

In time to come, financial institutions, both conventional and Islamic, will continue to tap into the power of technologies like blockchain and artificial intelligence to unbundle traditional financial services and allow financial systems to collaborate with fintech providers for timely and efficient customer experience. Banks are expected to collaborate with fintech start-ups to introduce innovative solutions ranging from payments and lending to robo-advisors services and data management. And this ability to collaborate and bridge the gap between the palate of services, businesses and consumers' needs is one reason fintech solutions are going to play an instrumental role in the future of banking and finance.

Despite the growth and early success so far of fintech firms, the fintech landscape is not without its challenges. While they are not burdened by traditional setup, they will have to think about regulations, the global scale of traditional financial institutions, and educating consumers on using complicated technology. The success of fintech will be purely dependent on consumer appetite for embracing technological advancement and on effective regulation being in place to protect the interest of all stakeholders.

Note

1 https://g7.gc.ca/en/official-documents/charlevoix-common-vision-future-artificial-intelligence/

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12

FINTECH IN ISLAMIC FINANCE

Business models and the need for legal solutions

Michael Gassner and Jonathan Lawrence

Introduction

Fintech is disruptive due to two economic drivers: first, through (near-) zero marginal costs, allowing the ability to scale services to include the poor; and second, the law of increasing returns, which results in monopolies as the first supplier receives the majority of income. This disruptive nature alters existing business models and has significant impacts on the wider economy, such as allowing for a more altruistic economy. However, it also has the downside of a shared economy, shifting formal employment with full social benefits into insecure freelancing.

Most economic models assume the law of diminishing returns. The economist, Turgot (1793) gave the example of agriculture: (1) increased input to produce harvest shows at first increasingly growing returns; (2) in the next phase, the returns still grow, but the growth itself is slowing down; and (3) finally, a phase is reached, whereby the returns with additional input become negative. This functional relationship between input and output has been widely empirically observed.

In the tech industry, Arthur (1996) first described that the law of diminishing returns is observed to be replaced by the law of increasing returns. He described the impact on the economy and how the rules of business are changing as follows:

> These properties, then, have become the hallmarks of increasing returns: market instability (the market tilts to favor a product that gets ahead), multiple potential outcomes (under different events in history, different operating systems could have won), unpredictability, the ability to lock in a market, the possible predominance of an inferior product, and fat profits for the winner.

Increasing returns are due to several factors, such as huge upfront costs, network effects and customer training. This is the unique feature of the overall tech industry:

> In high-tech markets, such mechanisms ensure that products that gain market advantage stand to gain further advantage, making these markets unstable and subject to lock-in. Of course, lock-in is not forever. Technology comes in waves, and a lock-in such as DOS's can last only as long as a particular wave lasts.
>
> *(Arthur 1996)*

Hence, certain tech products started with increasing returns over a significant period of time, like IBM PC or DOS preceding Windows (but still being part of it). Only a very substantial amount of time later can such tech products enter the traditional economics of diminishing returns. This viewpoint starts from the returns generated and how they evolve and increase over time, endangering even established old-economy players.

Another related feature that explains why the tech industry is special originates from the cost perspective. The term "zero-marginal costs" was popularised by Jeremy Rifkin the noted economic and social theorist. The term "zero marginal costs" refers to the phenomenon that digital services have a certain fixed cost; however, they are highly scalable (Rifkin 2014). In other words, every further unit of service costs nearly zero. With the advent of 3D printers, this could also extend to the manufacturing sector. With zero marginal cost becoming a reality, former idealistic ideas like a gift economy and the collaborative community can increasingly become a reality, thus creating a different type of market economy: not communism, not capitalism, but converging into something new – the third way. From an Islamic economic perspective, those phenomena have to be further analysed and better understood as to how to service the common good. Creating business models based on these economic drivers may well contribute to the wellbeing of society.

Islamic finance obstacles

Looking at the state of Islamic finance and how we can structure products today, the questions arise: what obstacles have been identified and what can fintech do to help us overcome them?

Most Muslim economists propose using profit/loss sharing as the favoured mode of finance and being as modest as possible even with the permissible debt modes. Why in today's Islamic finance world does this not happen? Some studies suggest the agency problem is why equity finance has not succeeded so far (Siddiqui 2005). However, Wahrenburg (1997) showed that agency problems exist in both equity and debt finance, and the minimal agency costs are reached if a mixture of debt and equity is offered. As far as agency problems are concerned,

at least measurable equity finance would be granted even by conventional banks; however, if this does not take place, other arguments would need to be sought.

Equity finance is discriminated against by Basel risk weighting. For providing profit/loss sharing capital, a bank must hold twice or fourfold its own equity compared to debt. Therefore, it would need twice or fourfold the return at the same risk level. This is surely not a viable way of doing business. We need to find alternative solutions to protect depositors other than making equity finance too expensive. Insurance/Takaful-based concepts might have the potential to solve this regulatory hurdle in a functioning economy. Fintech may contribute to solutions by reinventing the business models.

Furthermore, there is an increasing understanding that deductibility of interest is contributing to the same crowding out of equity finance from the economy. The International Chamber of Commerce (2012) suggested shifting the taxation model to a more neutral model. There is also a tendency in new tax rules to limit the deductibility in order to fight excessive tax avoidance structuring.

Associated with these wrongly set incentives is the debate to abolish the fractional reserve system altogether. While mostly held in academic circles, in June 2018 a group in Switzerland conducted a public vote, the "Swiss Referendum for Sovereign Money", which would have made full money reserves a constitutional requirement. The initiative was defeated in the vote with 76 per cent of votes rejecting it (Atkins 2018). Had it not been defeated, one would have wondered if anything is preventing people from using equity finance when the deposit basis, insured by the state against losses, disappears.

Fintech tools and their legal impact

Blockchain and currency

Blockchain is potentially the most disruptive technology developed. The unknown creator of the virtual currency bitcoin has used blockchain technology as a method to facilitate his or her currency experiment. Blockchain is a decentralised ledger technology, allowing and authenticating business transactions online without a central counterparty like a central bank or Euroclear/Clearstream for securities. It appears to work fast and efficiently.

First, the discussion of the currency, bitcoin, needs assessment from an Islamic perspective. Though the nature of currency in Islamic law, and a critical analysis of bitcoin from the Sharī'ah perspective was provided in Chapter 9, there are still some concerns about bitcoin being treated like a currency. Unlike a currency, bitcoin has neither intrinsic value (other than payment facilitation) nor government authority, which can impose the requirement of use by a sovereign state. Other experiments, like Storj, allow the creation of virtual currency based on blockchain technology but associated with a service like data storage. This is an area to be monitored.

Blockchain token

Blockchain also allows securitising virtually everything one could imagine, often called a "token". Start-ups like Lykke have exactly that in mind: to disrupt exchange and the way we deal with and arrange financing. Regulatory concerns are related to the currency monopoly of the state and include: the enforcement of anti-money laundering rules; for fintech companies, the offering of exchange or settlement services; and the requirement for a banking licence, e.g. if pre-payments are accepted to facilitate forward transactions. Governance will be impacted negatively if clear responsibilities to the parties involved are not given (such as dark web operations) and if cross-border transactions create uncertainty and/or impracticability in regard to the regulatory compliance, including the choice or lack of choice of governing law.

A blockchain token would likely be related in Islamic law to the AAOIFI Sharī'ah Standard for Sukuk. If it fits therein, the rules and permissibility would apply. For a token in the nature of certificates of deposit, regulatory concerns come into consideration, as it may result in a deposit-taking business model becoming subject to banking licence requirements. If the token represents a right rather than an ownership share, it would be deemed a derivative and would unlikely be permissible under Sharī'ah standards (subject to a further review).

Smart contracts, agents and the way to singularity

Smart contracts can be seen as software executing transactions based on rules and/or a certain level of artificial intelligence. Legally, this poses some questions. Is this software a mere extension of a letter, a phone call or a fax? Does it just transmit the transaction and the relevant details of offer and acceptance? Or does it provide further added steps? If the program code is a mere way of transmitting offer and acceptance details, then from an Islamic legal perspective, and likewise in common or civil law, the conclusion is simple, and no agency of the software code would be claimed – it is a mere tool for exchanging the will of the contractual parties.

However, if the software code allows negotiating the terms and conditions of the transaction, then the code becomes closer to what an appointed agent is supposed to be doing. Implicitly, we assign capacity to the software. The extent may still vary from rules set by the contractual parties (for example, (a) increase the offer on the auction platform until a maximum of $1,000 is reached or (b) retrieve data and compare the offers from three major electronic marketplaces and place the order with the cheapest) or it may go deeper in terms of decision-making (for example, please suggest the diet plan for next week according to my workout and then order the ingredients online). Such simple agencies may per se require the acceptance of the order by the agent, which can be deemed implicitly granted in the source code. But in the case of artificial intelligence, explicit consent of software may evolve to be a requirement.

French law considers the concept of emanation of personality distinct from the rights of a person. With artificial intelligence, this is an interesting legal fiction suitable to solve contractual issues like digital escrow agents (a software confirms to have received from party A the amount to be paid under certain conditions) and digital robots endowed with assets (software capable of acting on electronic markets and being endowed with funds but not owned by any natural or legal person).

Further legal discussion would need to show whether, aside from natural persons and registered legal persons, a third category needs to evolve, e.g. called an artificial person (nonnatural but with intelligence). Futurists like Kurzweil (2010) go beyond limited artificial intelligence to assume that by the year 2045 artificial and human intelligence will converge (Allen 2011). Considering the development of quant and artificial intelligence-based investment, the need to take the legal analysis further is clear: the role for digital agents and artificial persons is rising – computers are already beating world-class players of chess (Newborn 2012).

Decentralised autonomous organisation (DAO)

The DAO was designed as a "digital decentralised autonomous organisation" and a form of investor-directed fund for investments to be made. The source code of the software is open source. The investors can vote and democratically execute decision-making. The source code knows no defined governing law, but still the investments are effectively being made in certain existing jurisdictions, thus subjecting them to state laws in the end, while being set up by a non-state law-related organisation with no executive body other than the votes of the investors. This could be seen as a radical democratic process requiring tremendous engagement from all contributors.

In the absence of establishing legal liability, it is closest to the old partnership model of organisation. It may be interpreted as such if any of its transactions would be subject to court proceedings. Being a partnership, this means unlimited liability for the investors, which might be unenforceable in cases of anonymity or by the aforementioned creation of an artificial person (providing the anonymity and acting as an undisclosed digital agent).

Fintech business models

Payment solutions

There are various players in the fintech universe: the old established incumbent banks, the completely fresh start-ups and the mega tech companies. The latter are often referred to as GAFA – Google, Amazon, Facebook and Apple. Each of them is working on payment solutions and they have sufficient cash to either set up or purchase an internationally active bank, like Deutsche Bank, which is

within reach for all of them. Smaller fintech companies aiming to innovate in this field may choose to navigate regulation by entering a so-called "sandbox", allowing for lower regulatory hurdles to market entry.

The potential to disrupt the traditional way of making payments via bank accounts and credit cards will significantly impact the way banks operate and finance themselves. Similar to the regulatory introduction of a full money reserve system, banks may have to reinvent their overall business model of attracting funds. There are a lot of experiments from much smaller players for payment solutions and those making predictions are unclear about the outcome. Transferwise is a platform for foreign bank transfers with lower costs and is one notable start-up with a high market valuation to date.

Crowdfunding

Crowdfunding became known through firms like Kickstarter and Indiegogo. Creative projects are funded by supporters, who may in turn receive a reward. It can be a charitable platform to enhance innovation but also resembles the *istisna'a* or manufacturing contract of Islamic law. A more charity-inclined Muslim crowdfunding platform is named Launchgood. The biggest challenge for crowdfunding initiatives is collecting funds and forwarding them to the recipient, as in many jurisdictions this would require a full banking licence. Some jurisdictions have eased this requirement so that for the purposes of crowdfunding an escrow function became permissible with a simplified business model. Widely unexplored are the cross-border regulatory concerns if investors via the Internet participate in projects offered in another country.

Peer-to-peer lending

Peer-to-peer (P2P) lending is the disintermediation of banking per se. Creditors and debtors are being matched on a website and no longer on the balance sheet of a bank. Various platforms are operating in this field; the overall volumes achieved have not yet been making bankers concerned. However, the business model is already up and running; it just needs to accelerate. Lendingclub in the United States is one example. The most thriving country for P2P lending is, surprisingly, China. The regulators acted to limit shadow banking of this kind (Bloomberg 2016). Beehive in the UAE services SME companies, including those with Islamic modes of financing.

Peer-to-peer financing is also the business model where the benefits or the harms can be discussed most obviously in the context of *hiyal* (legalistic trickery) versus *makhraj* (legal solutions in compliance with the spirit of Islam). Therefore, in P2P financing, is the application of *tawarruq* warranted if an SME or microfinance is the target clientele? Financial inclusion is a great benefit, which could be achieved increasingly with fintech – lowering costs of access to finance and using big data (including budgeting tools) for under-served client segments enabling

replacement of an individual's credit history in making lending decisions. Any covenants can be monitored in real time and constantly, which, of course, will raise privacy issues and requires an Islamic ethical discourse.

Fintech can also deepen existing products like *tawarruq*/commodity if we are recalling the development of additional conditions being imposed. First, buying from the bank on a credit and selling back on a cash basis (or *bay al-inah*) is generally considered to be impermissible by the majority of Muslim jurists. One needs to sell to a third party. Next, it was ruled that the third party must be different from the party the bank has purchased the commodity from. Some scholars then ruled that the client must appoint the agent himself or herself rather than appointing the bank as the agent to sell the commodity. This progression of conditions can be easily executed via software acting as agent for the client. We can have 1,001 buyers and sellers of the commodity before it returns to the party from which the bank purchased it originally. We can reduce the underlying commodity to a single peppercorn, costing a fraction of a cent, but executing high-frequency trades per nanosecond to facilitate all commodity *murābahah* done today in the Islamic finance industry.

When do we accept form over substance in consideration of the benefits (SME, microfinance) and when do we accept substance over form (promoting equity finance even with deficiencies in the contracts)? Will fintech create setups to maximise form over substance, as with the earlier example of commodity *murābahah*? The platform called Kiva offers P2P microfinance credits with *murābahah* models, and the *waqf* crowdfunding platform cooperates and promotes it to Muslim investors. But how do we tackle the debt challenge? How do we promote fintech equity finance?

Equity finance

Peer-to-peer platforms offering equity finance to companies will have to be promoted by, and to, the Muslim world. They could and should become a major contribution to the economy and have the potential to create jobs and, consequently, political stability.

The fintech regulatory framework in many countries is still new or under considerable development and may otherwise conflict with existing securities regulation. The UK Financial Conduct Authority (FCA) has developed a regulatory sandbox in which fintech companies can develop their products in a more relaxed regulatory environment. At the same time, the FCA uses the sandbox to learn about the companies, their operations and requirements. Other countries have since followed, for example Indonesia is holding fintech conferences and has introduced regulatory measures, including its own regulatory-light "sandbox" for start-ups.

One of the first equity finance platforms established in the United States was Wefunder. As one of the authors tried out Kiva several years ago with $200 to find out the processes and procedures they are using, he did the same with

Wefunder (Muslim platforms include liwwa and Shekra) to obtain copies of the contracts and learn to understand the workflow. Since with conventional microfinance, violations of *fiqh* are obvious, one of the authors was hopeful that the equity finance aspect would be acceptable.

If Islamic finance wishes to become part of the early stage of financing industry innovation, then we need to have an understanding of the business customs and solutions and how to enter into such relationships in a *halal* manner. We need to be able to contract equity financing in a manner acceptable to *fiqh*. We should not stop short from serving the objectives of Sharī'ah due to a lack of acceptable legal forms, which evolved from international business customs of a given society (*urf*).

As another example, how do we handle investments in SME which are too indebted, including with conventional debt, to be investable by Islamic rules? Will Sharī'ah scholars commonly accept a *makhraj*? What about becoming a shareholder in the company to build a silent partnership for the business so that the debt level and nature does not become the responsibility of the Muslim investors? These questions, as well as others raised earlier, point to the fact that we need *makhraj* to promote equity finance.

Insurance

There is an innovative business model of insurance in Germany called Friendsurance, which we have reviewed and discussed with two scholars. The firm connects friends via Facebook, and they agree to pay each other if they have an insurance claim up to the sum of e.g. €200 per group member amounting to a total coverage of e.g. €2,000. Above this amount, they enter individually into a group insurance contract with the high deductible of €2,000.

The solidarity among the friends covers the high deductible and thus allows for cheaper insurance. For the insurance companies it solves an agency problem, as false claims are much lower if collected from friends rather than from an insurance company. This solidarity is desirable. This is the original form of Muslim solidarity. However, is the conventional insurance contract for Muslims permissible as well, particularly in jurisdictions where *takāful* is not available? Can it be seen as a tolerable reinsurance in the absence of *takāful*? Is such a fintech set-up a *makhraj* in countries without *takāful*?

Conclusion

The business models of fintech are evolving day by day. The legal framework needs to evolve to keep pace with the changes to the way financial services are structured and delivered. Islamic finance has an opportunity to expand by being at the cutting edge of such developments. Regulators are open to discussions about new ways of working; Islamic finance participants should grasp this opportunity.

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13

BLOCKCHAIN TECHNOLOGIES AND THE PROSPECTS OF SMART CONTRACTS IN ISLAMIC FINANCE

Volker Nienhaus

Introduction: Blockchains

The blockchain was introduced as the core technology of the bitcoin concept of Satoshi Nakamoto in 2008. A blockchain is a technique to store, add and validate transaction data in an open computer network by cryptographic techniques in such a way that the correctness, immutability and safety of the data is ensured by a decentralised consensus mechanism. All participants in a blockchain network (= computers linked to the network, called "nodes") hold identical copies of the database. Because the distributed database is a basic feature of a blockchain, this technology has also been called Distributed Ledger Technology (DLT) (Swan 2015; Antonopoulos 2017; Morabito 2017).

In blockchains new transaction data are added in a "sequential" manner (i.e. they are "linked" to the existing "chain" of previous transactions), and different blockchains apply different mechanisms for adding and validating new entries to the distributed database (= the blockchain). The rules of the blockchain define whether the updating of the database is done by specific nodes or a quorum of multiple participants.

Block creation

The sequential process of block chaining starts with a sender who creates a message to transfer a valuable asset, e.g. a fraction of a bitcoin, to a receiver. A cryptographic digital signature of the sender proves his ownership of the asset and the validity of the transfer to the public network address of the receiver. This message is transmitted through the blockchain network. Electronic wallets for bitcoins or other digital coins (= the "carriers" of the valuable asset) simplify the creation, transmission and reception of transactions. The transmitted message is received

by the nodes of the network. They can authenticate its validity by decrypting the digital signature. However, individual transactions are not sent directly to the distributed ledger. Instead, they have to be included in a new block, i.e. a collection of valid transactions, that shall subsequently be validated and added to the blockchain. Once the block is validated, the transaction is completed and confirmed.

Blocks are composed by those nodes in the network that play the role of potential validators, called "miners" in the bitcoin system. The miners are free to pick any of the pending transactions and add them to the block, which they will send to the network for validation (see later) in the next round. The blocks created by different miners can consist of different transactions, and a particular transaction of one sender may be included in blocks of different miners – or in none. This is where a transaction fee becomes important: senders can voluntarily offer a fee for the processing of their transaction. This fee and the fees of the other transactions in a validated block will go to the miner who successfully completed the validation task.

In bitcoin, a new block is added on average every ten minutes, and the data capacity of the block is limited to 1 MB. In the beginning of bitcoin, when the transaction volume was low, this capacity limitation was hardly felt, and the transaction fees were minimal or close to zero. This changed fundamentally in late 2017 when the price of bitcoins and the trading volume soared. Dataspace in blocks became a scarce resource, and the transaction fees as a payment for the use of limited dataspace shot up in parallel to the bitcoin price and trade volume – from an average of US$0.392 on 2 January 2017 to an all-time high of US$55.16 on 22 December 2017 and down to US$18.34 one month later.[1] As at 28 June 2018, the transaction fee was US$2. Since the required dataspace depends on the number of senders and receivers in a transfer message but does not vary with the transfer amount, the transfer of small amounts had become prohibitively expensive. Transactions of senders who did not offer sufficiently high fees were initially not picked by the miners but left on hold so that the senders had to wait for hours or days before their transactions were added to a block and became validated and confirmed. Waiting for hours can mean substantial gains or losses because of the high volatility of the bitcoin price or exchange rate. For example, if someone had transferred 1 BTC on 8 January 2018 at 8:00, he would have sent the equivalent of US$16,082. If the transfer had been confirmed 8 hours later, i.e. when the receiver could dispose of the transferred 1 BTC, the value would have dropped to US$14,630. In addition to this strong intra-day volatility, the bitcoin exchange rate also shows extreme fluctuations over a longer period such as one year: on 1 January 2017 the price was approximately 970 US$/BTC; it shot up to 19,400 US$/BTC on 17 December 2017 and came down to 13,400 US$/BTC on 31 December 2017. As at 1 January 2019, it further crashed to approximately 3,700 US$/BTC.

Block validation

While all nodes in a blockchain network share the distributed and continuously updated ledger, only some nodes act as validators who facilitate the updating of

the database. In a public blockchain ("permissionless ledger"), any node can opt to be a validator, while in a private blockchain ("permissioned ledger") only authorised nodes can validate blocks (Lai and Lee 2018). The validation (and hence the updating of the database) is done through an iterative process that is successful once a consensus on the validity is achieved. The two most prominent consensus mechanisms of public blockchains are proof of work and proof of stake.

Proof of work (PoW): Each new block contains a cryptographic hash value of the so-far last (= previous) block of the chain. A new block is accepted only if a PoW is provided. The hash value is the output of a cryptographic hash function, and the required work is – simply speaking – finding the input to the hash function that generates the given output. Although the hash function and the hash value are known, it is not possible to find the correct input by "reversed engineering". Instead, the solution requires "brute force" methods, meaning trial and error with huge numbers of possible input strings. Once the correct input has been found and transmitted to the network, it is easy for other nodes to verify the correctness of the found solution (by feeding the hash function with the input string and comparing the results with the known hash value) and confirm this.

In the bitcoin blockchain, nodes that validate blocks by solving the cryptographic task are called "miners". The miner who is the first to find the solution is rewarded by new bitcoins (actually 12.5 bitcoins) and by the transaction fees of the validated block. The bitcoin protocol has set a maximum for the number of bitcoins to be mined to 21 million, and the creation of new bitcoins will come to an end by the year 2140. Miners will then be rewarded only by transaction fees.

The chances to be the first to find the solution of the cryptographic task and to get the reward depend on the number of trials a miner can run per second, and this increases with the computing power at his disposal. Thus, miners have strong incentives to ramp up the number and capabilities of their machines. This has resulted in a rapidly growing and massive consumption of electrical energy. The estimated annual energy consumption is comparable to that of countries or cities such as New Zealand or Hong Kong.[2] The huge energy consumption seems to be wasteful, but it also protects the blockchain against hacking: a modification of past transactions would require the consensus of 50 per cent plus 1 of the network nodes, which means control of computing power and energy that roughly equals half of the combined power of the network. It should be noted that the immutability of a blockchain is not ensured by mathematics or cryptography but by economics: in theory, a 51 per cent attack is always possible but the more miners and computing power that are attracted to a particular blockchain, the more expensive a 51 per cent attack would be. Costs of attacks on blockchains with a large number of miners would exceed possible gains. However, computing power is continuously getting cheaper and huge capacities can be rented on an hourly basis. For the foreseeable future, this is not a serious threat for bitcoin, but it definitively is for many smaller PoW-based cryptocurrencies with much less computing power: In May 2018, 5 of them (Monacoin, bitcoin Gold,

Zencash, Verge, Litecoin Cash) were hit by variants of a 51 per cent attack, and the attackers carried off millions of dollars (Hertig 2018).

Proof of stake (PoS): The PoS does not require a wasteful energy consumption. Instead, the validation of blocks requires the consensus of participants who hold in aggregate more than 50 per cent of the coins of the network. The Ethereum blockchain makes use of the PoS approach (Dannen 2017). The coins are not money by themselves, but they do have a financial value because they must be bought by those who want to use the network (for the specific services it was designed for). The voting power of a participant is proportionate to his or her holding of coins. This is justified by the assumption that participants with larger holdings have a stronger interest in protecting the integrity of the network: if the network integrity is compromised, the market price of the coins will drop, and this will negatively affect the participants with the highest coin holdings the most. A flipside of this resource-saving consensus mechanism is that it is easier to bring together the required majority of coin holders than the majority of computing power for a retroactive change of the blockchain. This is a latent threat particularly in new blockchains where the coin ownership is still rather concentrated among founders and early adopters, and in older systems collusions cannot be ruled out completely. However, more sophisticated proof of stake methods have been developed to minimise incentives or possibilities for such objectionable practices (Ray 2017).[3]

Block chaining

After its validation, the new block is added ("chained") to the existing blockchain and the updated ledger is broadcasted to the network. The time for block creation and validation varies significantly between different types of blockchains. Accordingly, the process of ledger updating and the time for the confirmation of transactions may take a few seconds, several minutes, an hour or more in worst case situations. With an increasing volume of transactions, the sequential linking mechanism of blockchains can become a bottleneck.[4] Therefore, other approaches have been developed to add and verify new data entries to the distributed ledger in a non-sequential manner or to create a distributed ledger without the inherent limitations of a blockchain.

A promising DLT without a blockchain is the IOTA system (Limo 2017; Schiener 2017). It replaces the blockchain by what is known as the "tangle", a directed acyclic (non-recursive) graph (DAG) for storing transactions (Popov 2018). In a very simplified manner, the IOTA tangle may be visualised as a graphic representation of a flight of birds: imagine a swarm of birds all flying in the same direction, say from east to west. New birds can join the swarm by linking themselves to two birds flying at the end of the swarm. Now, the joining birds become the end of the swarm, and the next group of joining birds will link to them and so forth. In a DAG, the birds are symbolised by dots (called "sites"), and the links are represented by arrows (called "edges"). In a graph that

depicts the full "history" of the tangle, all sites have sent two arrows forward and have received (at least[5]) two arrows "from behind" with the exception of the most recently joining (= last) sites which do not yet have successors.[6] The links or edges in the DAG stand for a confirmation of a previous transaction by the joining transactions. Embedded in the data of each transaction is a kind of cryptographic puzzle which has to be solved. This is similar to the PoW in bitcoin, but with a much lower level of difficulty which does not require any special computing device. The solution of the puzzles confirms the transactions and adds the new one to the tangle. By this method, the users of the network are at the same time the validators of transactions, and the confirmation of transactions by them neither requires significant resources nor transaction fees. The systemic bottlenecks of blockchains regarding validation capacities and scalability do not exist. To the contrary, with a growing number of transactions, the tangle can confirm transactions faster, and the system becomes more efficient. Thus, the tangle is highly scalable. Its limit is not the capacity of validators as in blockchains but the bandwidth for data transfers in the tangle. In short, IOTA is a highly scalable and fast DLT that has no blocks, no mining and no transaction fees. This makes it particularly suitable for micropayments in the internet of things (IoT).

Bitcoin from a Sharī'ah perspective

For an assessment of bitcoin from a Sharī'ah perspective, it is important to distinguish the coin "bitcoin" from the underlying blockchain or DLT. While the blockchain or DLT is just a technical device like a combustion engine in a car that poses no serious Sharī'ah issues, the bitcoin is a financial asset that requires a closer examination. While some Sharī'ah scholars argued in a formalistic manner that bitcoins are not money because they are not recognised as legal tender, others held the opposite view, but they raised concerns about the volatility of the price with respect to exchange rates – already at a time, when the fluctuations were minimal compared to what happened in 2017.

The turbulences of 2017 indicate a serious *gharar* issue: among the earliest bitcoin-based business applications were payment systems for international remittances. Senders exchanged their local currency (e.g. Qatari Riyal) for bitcoins (BTC) and transferred the BTC via the blockchain to receivers who exchanged the BTC for their local currency (e.g. Pakistani Rupee). By the drastic increase of bitcoin exchange rates, the transaction fee volatility and the network traffic, this model became seriously tarnished. The contracting parties did not have sufficient control on whether it takes 20 minutes or 20 hours before their blockchain transaction is confirmed so that received bitcoins can be exchanged for local currency. In a world of highly volatile exchange rates, the value of the received bitcoins in local currency is extremely uncertain. *Gharar* seems to be so massive that the Sharī'ah compliance of the bitcoin remittance application may be challenged.

Since mid-2017, it has become obvious that the use of bitcoin for payments is neither cheap nor fast. The excessive price volatility has damaged bitcoin's

suitability as a measure and store of value, and unreasonably high transaction fees, delays and serious capacity limitations have destroyed its qualification as a medium of exchange. The reasons for this are of structural and permanent nature and not teething troubles that disappear once the system has found wider acceptance. The insufficient speed and scalability and the resulting very high and volatile costs for the verification of transactions through a wasteful process are fundamental flaws in the design of bitcoin that make it unsuitable as a replacement for fiat money.

Furthermore, and contrary to what is sometimes asserted, bitcoin is not widely used as money in practice. Hardly any local shop is accepting bitcoin and, apart from the darknet, only a very small number of online retailers and service providers accept bitcoin payments. Expedia and Overstock.com are two prominent examples of large companies accepting bitcoin payments. However, they do not quote prices in BTC but in US$. Only at checkout, the US$ amount is converted to BTC with an exchange rate provided by Coinbase (a large cryptocurrency exchange) and valid for ten minutes (after which the exchange rate is updated). Neither company states that they accept bitcoin as money (i.e. as a financial asset that by itself settles their claims against the customer), but only as a "method of payment" (Expedia) or "form of payment" (Overstock.com). Their terms and conditions clarify that in case of a refund, the US$ amount is converted to BTC with the exchange rate on the day of the refund so that the customer may receive more or less bitcoin than initially transferred. The companies accepting bitcoin payments do not hold BTC balances but convert received BTC into US$ immediately (and US$ into BTC when needed). They do not use bitcoin as money in the proper sense (i.e. as a unit of account, store of value, medium of exchange), but only the bitcoin payment mechanism or technology for the transfer of a financial asset that is converted automatically (via Coinbase) into fiat money. The non-acceptance of bitcoin as money is even more explicit in a statement of a Starbucks spokesperson in reaction to a false CNBC report that the company would soon allow customers to pay with bitcoin: Starbucks entered into a partnership with Microsoft and Intercontinental Exchange to help people spend their cryptocurrencies, but: "It is important to clarify that we are not accepting digital assets at Starbucks. Rather the exchange will convert digital assets like bitcoin into US dollars, which can be used at Starbucks" (Pearson 2018).

The technicalities of bitcoin have been explained in some detail in order to substantiate that, at least for the foreseeable future and in the "official" economy, bitcoin has failed to become money. If a cryptocurrency will ever seriously challenge fiat money, it will not be bitcoin as it is known today. This conclusion may necessitate a revision or updating of some earlier assessments and legal opinions of Sharī'ah experts (Javed 2014; Evans 2015; Zainudin 2016; Barkatulla 2016; Kahf 2017; Adam 2018b; Mumbere 2018; Abu-Bakar 2018).

Bitcoins are digital assets that represent nothing but themselves. It will be explained later that the coins or tokens of other blockchains such as Ethereum are required to access a DLT network that facilitates valuable services such as

the smooth transfer of ownership titles, the exchange of digital collectables (e.g. "Cryptokitties")[7] or the execution of smart contracts. The coins may also be needed for the payment of transaction fees. In contrast to these DLT networks, the original bitcoin blockchain had no other purpose than the transfer of bitcoins, and bitcoins – conceptualised as (a replacement of fiat) money – do not represent anything but bitcoins. Whether bitcoins are money or not depends on their general acceptance. Effectively, bitcoins are by no means generally accepted as an alternative to fiat money. The holding of bitcoins does not generate any return, but bitcoin holders could gain (or lose) from changes in the exchange rate of bitcoins against fiat money (the "price" of bitcoins). Since bitcoins have failed to replace money, significant price increases do not result from increases in the demand for transactional purposes (in the official economy). In an economy free of illegal transactions, the only plausible cause for bitcoin price increases is a speculative demand. Speculation combined with the herding behaviour of an ill-informed crowd of retail investors can create price bubbles that expand and oscillate for quite a while before they eventually burst, but even then, recoveries and cycles can re-emerge. It is up to Sharī'ah scholars to clarify whether a participation in such a market is permissible or not. For their judgement, the scholars should also consider the enormous resource requirements for the validation of transactions. If bitcoins became money, it would probably be the monetary system with the highest consumption of real resources that the world has ever seen.

There is a tendency among Sharī'ah scholars to generalise and come to wholesale judgements about bitcoins and other blockchains. This may not be appropriate insofar as bitcoin is the only blockchain concept that had the explicit objective of replacing fiat money. Most, if not all, other blockchain concepts, respectively DLT applications that also use "coins", do not aim at becoming a replacement of fiat money. Their prime objective is the provision of valuable services, for which "payments" (= transfers of "coins") within the blockchain network are required. The coins of a specific DLT network have financial value based on the network services they can buy. While bitcoin represents nothing but bitcoin, these coins represent fiat money that, in the last instance, is required to pay for the specific network services. While bitcoins are purely financial assets, the other coins are kind of "service-based" financial assets. There is a transactional demand for coins that is derived from the demand for the network services. This is a significant difference that should not be overlooked in an assessment from a Sharī'ah perspective, although prices of coins may also be inflated by speculative demand. This issue will be resumed in the later section on initial coin offerings (ICOs).

Coins, tokens and decentralised applications

The second basic feature of blockchains, besides the distributed ledger, are the "carriers" of information that is stored on the distributed ledger. In the original concept, the bitcoin was designed for the straightforward transfer of monetary units among blockchain participants (Nakamoto n.d.). The data-carrier bitcoin

was structured well for that purpose, but it turned out that the design of bitcoins is not very suitable for other purposes in a DLT setting.

Coins and tokens: Terminology

The term "coin" was appropriate for the data carrier of a system aiming to become digital money. Reminiscent of the terminology of the original blockchain, "coin" became the commonly used name of data carriers in a wider range of blockchain systems, summarised as "altcoins" (= alternative coins) and often referred to as "cryptocurrencies" (Lee 2015; Peters et al. 2015; Narayanan et al. 2016; Low and Teo 2018). However, only a (very) small minority of altcoins or new blockchains were structured as digital replacements of fiat money (i.e. with the aim to become money by themselves). Instead, most systems aimed to make the handling of fiat money more convenient and cheaper, especially small local payments or international money transfers with different currencies involved. In addition to money-related altcoins, a considerable number of DLT applications deploy the immutability and transparency of a blockchain for purposes which have nothing to do with money or financial transfers, e.g. for public record keeping (e.g. land and property titles, vehicle registrations, business licenses), private record keeping (e.g. wills, trusts, escrows), attestations (e.g. proof of ownership, proof of origin) or the management of intangible assets (e.g. patents, trade-marks, digital collectibles). The lax use of the terms "coin" and "cryptocurrencies" gave rise to misunderstandings and confusions that could have been avoided if the data carriers of at least those blockchain applications unrelated to money transfers had been called "tokens" instead of "coins".

Blockchains for and beyond finance

The blockchain concept spread rapidly and many start-ups explored possible application in finance and beyond (Rayes and Salam 2016; Raj and Raman 2017) due to a rather long list of attractive features of blockchains respectively DLTs:

- Blockchain technologies have the potential to speed up transactions and processes significantly;
- DLT networks are more robust and better protected against technical breakdowns than centralised systems;
- Public DLT systems of the blockchain type do not require trust in a central authority like a clearing house or central bank ("disintermediation of trust");
- Public blockchains create extremely temper-resistant (immutable) ledgers with total transparency of all transactions ever recorded (but also with the possibility of a high degree of anonymity of senders and receives, if required);
- Public blockchains make transactions after block validation irreversible; this does not apply to all kinds of private blockchains;

- Distributed ledgers can record all kinds of intangible assets (from money to transferable rights) and facilitate simple, fast and secure transfers;
- Blockchains facilitate substantial cost savings for financial institutions through real-time payments and fast reconciliation and settlement which reduces the need of liquidity buffers;
- Private blockchains can direct (and restrict) the information flow and ledger access to authorised network participants only;
- Distributed ledgers reduce systemwide the volume of and errors in manual data entry and reduce costs of supervision;
- Distributed ledgers can reduce costs for (redundant) data storage and for the validation of data authenticity;
- Permissioned access should reduce the risk of fraud and data theft (e.g. by hacking a central server) and enhance privacy and data security;
- Private B2B blockchain platforms facilitate decentralised transaction tracking, auditing and reconciliation;
- Private blockchains (may) allow the use of smart contracts for the execution of self-enforcing business rules (such as globally accessible automatic procurement and vendor payments);
- Consumers should benefit from cheaper, faster and more convenient retails finance solutions.

In short, convenience, speed, reliability and cost efficiency are the main promises of blockchains respectively DLTs. However, the utilisation of many of these advantages requires carriers (tokens or coins) that are able to transport larger quantities and different qualities of data than the rather specialised original bitcoins.

The need for more sophisticated coins

The bitcoin blockchain has been enriched by open source projects such as "colored coins" (Madeira 2018). These coins are the original bitcoins used for the transfer of valuable assets other than money. This is possible because the transfer of a bitcoin as a monetary unit does not use the full data space that a bitcoin as a token (= information carrier) provides. Unused metadata allow the "implantation" of the digital representation of a real-world asset into a bitcoin token so that it becomes a "coloured" coin. As a coloured coin is technically the original bitcoin but with an extended information content, it is transferred through the blockchain network as a "normal" bitcoin. A coloured bitcoin could use a coin with a very smallest value (e.g. the equivalent of 1 US Cent) for the transfer procedure. Its "real" value is the "implanted" digital representation of an asset, and the transfer of the coloured bitcoin means the transfer of the ownership of this implanted asset.

However, the available data space in bitcoins is insufficient for more than basic descriptions or representations of objects or rights. Therefore, alternative

blockchains with more sophisticated tokens were developed that could not only store larger quantities of data for more detailed descriptions of objects or rights, but also a different quality of data, namely executable computer code. A blockchain that has become very popular among application developers is Ethereum: it incorporates the scripting language "Solidity" for the programming of more complex transactions that go beyond the simple transfer of the nominal or embedded value of a token from one user to another (Dannen 2017).

Decentralised applications (DApps)

The Ethereum blockchain with Ether as its own token can be considered as a kind of operating system for a wide range of decentralised applications (Anon. 2017). While standard web applications run on a central host server, decentralised applications run on a P2P network of computers. Early examples of decentralised applications are internet-based file-sharing systems such as Napster, Gnutella or Spotify. Decentralised applications that run on a blockchain are called "DApps" ((pronounced: Dee-Apps). They combine the advantages of a peer-to-peer network (such as having no central point of failure, avoiding "honeypots" of data that attract hackers, being censor-resistant, having combined computing power) with the advantages of a distributed ledger (such as transparency, distributed storage, distributed consensus mechanism, tamper-proof database with immutable records). Defining features of DApps are (Vollstädt 2015; Raval 2016; Khatwani 2017) (i) an open source application's protocol, (ii) the cryptographic storage of data and records in a public and decentralised database (blockchain), (iii) a mechanism to create cryptographic tokens (e.g. bitcoins, Ether) that are required to access and use the application and (iv) a procedure to validate entries into the blockchain (i.e. into the decentralised database).

All these features can be found in bitcoin, the very first DApp, designed for P2P money transfer. DApps can run on an existing blockchain (such as Ethereum) or create their own. The Ethereum blockchain, with its built-in scripting language, offers flexibility for the programming and execution of smart contracts (see later) in a distributed international computer network, the so-called "Ethereum Virtual Machine" (Patron 2016). A large and continuously growing number of DApps for a wide range of financial applications as well as applications for the IoT has emerged.[8] Tokens are required to get access to the DApp and/or to carry out the transactions for which the DApp has been designed.

Initial coin offerings and start-up financing

The fintech scene has attracted a large number of start-ups with ideas for blockchain models and DApps whose founders usually face the problem of financing the realisation of their ideas – from building and launching the DApp to reaching a critical mass of paying users. As banks usually do not fund risky start-ups, the founders had to approach venture capitalists and business angels for seed and

early-stage financing. These investors provide capital only after thorough due diligence. In return, the start-up founders have to transfer sizable equity shares to the capital providers and must accept significant control rights. Venture capitalists expect to make a profit from selling their equity shares later in an initial public offering (IPO). As an alternative, some start-ups raised capital through donation-based or equity crowdfunding, but only with limited success.

The financing model for fintech start-ups changed notably since mid-2016 when a few pioneers had successfully tried fundraising by a combination of elements of crowdfunding and IPOs in the presale of tokens ("token sales"), now widely known as initial coin offering (ICO). Tokens are not only a technical requirement but also a key element in the business model of many DApps. The initiators of a DApp define the maximum number of tokens that will ever be generated for their DApp and explain the process of the token generation. A credible announcement of the maximum number tokens and of a token generation process which cannot be changed afterwards establish the scarcity (= limited supply) of tokens which is a necessary condition for their financial value. Usually the founders of a DApp reserve a certain percentage of tokens for themselves and sell the other tokens for fiat money or a recognised cryptocurrency (such as bitcoin or Ether) to the public. To that end, they publish on a crowdfunding platform information (a "Whitepaper") about the capabilities and features of the planned blockchain ecosystem or DApp for which the offered tokens will be needed. Addressees of the information disclosed on the platform are not expert venture capitalists but members of the tech-savvy "crowd" with more technical knowledge than expertise for the evaluation of business plans. Initially, the crowd was reluctant to provide capital in this way. From 2013, when this funding model was pioneered for the first time, up to early 2016, the number and size of ICOs were very small. Only since mid-2016 have ICOs become more frequent and larger in size, before they took off in the third quarter of 2017.

Rocketing cryptocurrencies and ICO hype

The third quarter of 2017 has been characterised as "transformative" and "milestone" for the cryptocurrency (= token) markets (Downes 2017b). The number of ICOs increased from 43 in 2016 to 343 in 2017, and the funding soared from US$256 million to US$5.5 billion.[9] Until 2016, blockchain projects raised significantly less from token presales than from venture capital (Lundy et al. 2016: 7). Since then this relation has reversed completely: in 2017, over five times more capital was deployed to blockchain start-ups in ICOs than in equity financings (Anon. 2018). The growth of collected funds was driven by a few large ICOs while the average size of 90 per cent of the ICOs increased at a much lower rate (Downes 2017b). These trends continued in 2018 where, in the first half-year only, 394 ICOs raised US$13.6 billion. Nearly half of this amount was collected by only three ICOs. Investors were not only willing to finance a significantly larger number of projects with similar amounts per project as pre-2017; they

also concentrated additional funds on a small number of promising ambitious blockchain-related projects for which they were ready to provide much larger amounts. These projects were prime targets for institutional investors, including venture capital firms who had adjusted their investment strategy in reaction to the preference of start-ups for ICOs.

The huge increase of ICOs happened parallel to the explosion of the US dollar value of bitcoins and other cryptocurrencies. This has most probably impacted the motivations of crowd-investors and initiators of ICOs, and concerns about a very high percentage of ICOs being scams and fraud are rising (Dickson 2017; Naumoff 2017;Patel 2017; Balaban 2017; Roberts 2018; Seth 2018).[10]

The demand for tokens comes from three different groups: early adopters, investors and speculators. (i) Early adopters are (prospective) users of the new blockchain or DApp, i.e. individuals or businesses who (plan to) carry out transactions for which they will need the tokens as admission or transaction fees. (ii) Investors, in contrast, do not intend to use the blockchain or DApp by themselves. They expect that the future demand for tokens will grow when more and more individuals and businesses use the DApp and have to buy tokens on the secondary market. (iii) Speculators buy tokens in the hope that they can gain from price increases caused by "irrational exuberance" (Shiller 2015) and herding behaviour in a hyped market.

The initiators of ICOs have realised the limited business expertise of the crowd, but also a rather limited technical understanding of many early adopters who, to a large percentage, are retail investors. There is a significant information asymmetry between fund providers and fund raisers. Initiators of ICOs have aligned their fundraising targets correspondingly: their targets were less determined by the financial needs for the development of their blockchain or DApp project rather than by what the (ill-informed) market is willing to give. The collection of "generous" amounts is rather risk-free for the issuers because the tokens "do not represent any underlying asset, they do not give rights to a dividend, and no equity is represented through them" (Vollstädt 2015). Although serious consumer protection issues have emerged, ICOs are still widely unregulated in most jurisdictions (Downes 2017a).

Coins and zakāt

Bitcoins and other network tokens are valuable digital objects for which people are willing to spend money. This raises the question of how these objects should be treated with regard to the *zakāt*.

The answer depends on whether the digital objects are considered to be money or not. Here it is important to distinguish between bitcoins and other network tokens. Bitcoins have been conceptualised as private money, i.e. replacement of state-controlled fiat money, so that it may be justified to classify them as money and treat them like fiat money, i.e. make them subject to *zakāt* of 2.5 per cent (Adam 2018a). In principle, the payment of *zakāt* could be made in bitcoins.

The Shacklewell Lane Mosque (also known as Masjid Ramadan) in London is a pioneer in accepting the payment of *zakāt* in bitcoin (and Ethereum). The bitcoin wallet address of the Mosque is given on its website.[11]

This is a major difference to the "bitcoin payments" option of Expedia, Overstock.com and Starbucks as outlined earlier: there the bitcoins are transferred by the customer to the wallet address of an intermediary (a cryptocurrency exchange) that converts BTC to US$ and credits the US$ to a US$ account of the payment recipient, while the Shacklewell Lane Mosque is the direct recipient of BTC. The mosque may keep the BTC in its wallet for later BTC transfers or convert it into fiat money. However, it should be noted that the acceptance of bitcoins for *zakāt* as such does not imply that the mosque regards bitcoin as money. The mosque calls the *zakāt* payments "donations", which reflects the fact that there is no financial claim by the mosque on the person paying *zakāt*. The mosque could accept the voluntary transfer (= donation) of any kind of financial asset, such as stocks or *sukūk*, and the acceptance as a donation does not change the monetary quality of the transferred asset. Hence, bitcoin may or may not be regarded as money by the mosque. The conclusion that bitcoin is regarded as money could only be drawn if the mosque accepted a bitcoin payment as the final settlement of a claim that the mosque has against somebody.

Things become complicated further in countries where the government has prohibited the use of bitcoins. There, *zakāt* has to be paid in a permissible currency, for example US dollars. This requires the calculation of the value of the bitcoin holding in this currency. *Zakāt* manuals suggest using the actual market prices of securities or exchange rates of foreign currencies on the day when *zakāt* is due to calculate the value of these assets. There is a conceptual problem if this rule is applied in narrow markets where a relatively small additional supply causes a large price reaction. The huge volatilities in the cryptocurrency markets indicate that they fall into this category. This means that the (individual or collective) owners of a relatively large number of bitcoins would not be able to sell them at the given market price because the additional supply would cause an immediate price drop.

The discrepancy between "paper wealth" and "realisable wealth" (= the amount that can be realised if the tokens were actually sold) is particularly pronounced in highly volatile cryptocurrency markets. Calculating *zakāt* on the basis of paper wealth implies a (much) higher "effective" *zakāt* rate than 2.5 per cent and a disproportionate burden compared to the *zakāt* levy on other assets with broader and more stable markets (such as foreign currencies). Unfortunately, there is no exact method to determine the "correct" price for the calculation of the realisable wealth. It is only known that that price is less than the actual market price, but it is not known how much less.

It has already been discussed that bitcoins turned out to be unsuitable to replace fiat money and that they are not widely used for payments. If bitcoins are not classified as money but as objects of speculation (Kahf 2017), then they should not be held by Muslims at all. If Muslims happen to hold bitcoin, they should dispose of them as soon as possible. *Zakāt* is only "imposed on assets

that are lawfully owned. Zakāt cannot be calculated on prohibited or unlawful wealth" (Rahman 2003: 56).

Most other so-called "cryptocurrencies", i.e. tokens of other blockchain networks, have not been conceptualised as a replacement for fiat money. They were not structured for general use as currency. Instead, they are needed to get access to a specified blockchain network and/or to pay for services provided by or through this network (e.g. to pay transaction fees for using the Ethereum blockchain[12] and to pay for the purchase of a unique digital cat on the Ethereum-based CryptoKitties marketplace[13]). It may be that a person has bought a significant quantity of tokens in an ICO with the intention of using them when the respective DApp goes live. Although these tokens should not be considered money, they represent a financial value and could be zakātable objects. If they were zakātable objects, the problem of the discrepancy between paper wealth and realisable wealth would be pertinent.

For Islamic jurists, a condition for the zakātability of wealth is that it "must either be actually growing or have the potential for growth. Growth means something that provides the owner with profit and benefit" (Al-Qaradawi 2000: 59 [chap. 1]). Although the consistency and relevance of this requirement have been seriously challenged (Kahf 1991; Haneef and Mahmud 2011: 66–67), it still has practical relevance and is quoted in manuals for the calculation of *zakāt* (Rahman 2003; The Zakat Foundation of America 2007).

Hence, the question is whether tokens grow or have the potential for growth. If the holders of tokens use them for payments (in the future), the number of tokens in their holdings will not grow but shrink. However, the use of the tokens provides them with a benefit: the access to and use of a network and application. The holding of tokens may also provide a profit if the value of the tokens appreciates, for example because the demand for tokens increases as a result of the growing use of the respective network or application. Suppose that Sharī'ah scholars, therefore, confirm the zakātability of token holdings (and a reasonable method for the calculation of the realisable wealth has been found). Then the next question is for the appropriate *zakāt* rate. The answer depends on whether token holdings are seen in analogy to so-called "exploited assets" or shares and *ṣukūk* (Islamic bonds).

"Exploited assets are defined as forms of wealth used to produce exchangeable services or goods that are sold for profit without exhausting the exploited assets themselves" (Al-Qaradawi 2000: 236). In commercial terminology, exploited assets are fixed assets such as machinery, means of transportation or office equipment. Over time, the value of these assets (contrary to what the definition suggests) is diminished by wear and tear, and after a certain period they are physically exhausted. Large holdings of tokens which are consumed gradually have similar characteristics and may be compared to fixed assets. This classification is important because *zakāt* on exploited assets is not calculated on the basis of the asset value but on the basis of the profit or income generated by the asset (however this is determined). There are debates about whether the rate should be 5 per cent or 10 per cent, but there is a consensus that the basis for the *zakāt* calculation is not

the market value of the asset but the profit or income derived from or generated by it (The Zakat Foundation of America 2007: 44–45).

Alternatively, tokens could be treated in analogy to stocks and shares or *ṣukūk*. There are different opinions on the basis and the rate for the calculation of *zakāt* for stocks and shares which generate a return (dividend). One view is that *zakāt* should be calculated as 10 per cent of the return, while the other view suggests 2.5 per cent of the market value of stocks and shares (The Zakat Foundation of America 2007: 51–52). The *zakāt* on *ṣukūk* would also be 2.5 per cent of the market value. As token holdings do not generate returns, only the market value could be the basis for *zakāt* (and the problems of paper versus realisable wealth applies). However, tokens may neither represent ownership of anything but the token itself nor do they constitute a claim for the repayment of a certain sum of money. If this applies, then token holdings are either not zakātable or fresh thinking is required to develop a new analogy that establishes the zakātability of non-money tokens.

The tokens outlined so far give access to a network, and their use as a means of payment is restricted to particular apps running on the network's blockchain. These tokens are quite different from stocks and shares or bonds. However, the next section will outline tokens that go beyond the mere payment function and represent capital shares and voting rights in a collective investment scheme. They have been classified by a regulatory authority as securities that fall under the securities law of the respective country. Avoidance of arbitrage and "equal treatment of equal substance" suggest a *zakāt* treatment of securities-like tokens in parallel to stocks, shares, bonds and other zakātable financial instruments.

This section on tokens and *zakāt* should have clarified the need for a distinction of (at least) three different types of tokens respectively coins or cryptocurrencies: (i) coins conceptualised as a general replacement of fiat money, (ii) coins structured as entry tokens and blockchain- or application-specific means of payments, (iii) coins developed as the backbone of collective investment schemes. They all can play different roles in Islamic finance and entail specific Sharī'ah issues (of which the *zakāt* treatment is only an example) that cannot be covered by a wholesale judgement on "the" crypto-coins.

Smart contracts

A large number of the ICOs raised capital for the financing of the development of DApps that utilise the blockchain and scripting language of Ethereum for the programming of so-called smart contracts (Shadab 2014; Dannen 2017). The term "smart contract" was not coined by lawyers but by computer engineers. A smart contract is software code representing business logic that runs on a blockchain network.

If–then sequences

In its simplest form, a smart contract can be understood as an if–then command: if the code receives certain information, then a particular command or sequence

of commands is executed. As an integral component of a DApp, the smart contract gets a triggering external information from a so-called "oracle" that confirms a real-world occurrence, and the computer code then executes a single or compound transaction on the blockchain (e.g. a transfer of the ownership of imported goods and the payment of their price in a foreign currency).

The following example illustrates the disruptive potential of smart contracts for "middlemen" who organise conditional financial transfers: A crowdfunding platform not only brings together supply and demand but also serves as a trusted third-party that collects money from the fund providers, holds it in an escrow account, checks whether the funding target is achieved and – if the target is achieved – transfers the money to the fund seekers or – if the target is not achieved – returns it to the fund providers. A smart contract can automate these conditional financial transactions and eliminate the need for a platform acting as a middleman. Disrupters like platform operators can themselves be partially disrupted by smart contracts and DApps.

Many processes and procedures in the financial industry could be "automated" by smart contracts, for example the documentation, invoicing and payments in trade financing, the trading and settlement of derivatives and syndicated loans, the origination of mortgages, the claim processing in insurance or insurance for the sharing economy (Capgemini 2016). Other examples of smart contracts that link transactions in the financial sector with the non-financial world include automatic systems for payments in proportion to the use of copyrighted digital content (such as music, videos, news, journals) or the automated management of sales of household-produced electric energy on an electronic power exchange.

As smart contracts run on a blockchain, they cannot be changed or stopped once they have been activated. The outcome of a smart contract is recorded on the blockchain and is immutable.

> By using a smart contract, parties commit themselves to be bound by the rules and determinations of the underlying code. Doing so in principle removes the potential for parties to have a dispute: both parties are held to whatever outcome the smart contract determines.
>
> *(Shadab 2014)*

The term "smart contract" suggests that the computer code itself has the legal quality of a contract ("the code is law"), but this is challenged by lawyers. Their view is that a computer code cannot be legally binding (Howlett 2016; Raskin 2017). What can be legally binding is the agreement to apply the technical code for a specific purpose or an intended outcome. Such an agreement is necessary to "legalise" the results of the execution of the code. The language of smart contracts is computer code which is probably not understood by all contracting parties. Then it is necessary to write down the will of the parties in human language so that, in case of a dispute about outcomes, a third party can check whether the will of the contracting parties was accurately reflected by the computer code and

executed accordingly. However, a public blockchain does not allow a third party to intervene or reverse a transaction (as they are conceptually irrevocable), and an ex-post "correction" of unintended consequences of the execution of a smart contract is by no means trivial – in particular not if the parties are in a dispute about what went wrong and why. But the complexity of smart contracts can be further enhanced by so-called decentralised autonomous organisations.

Decentralised autonomous organisations

DApps can automate processes, but they can also create so-far unknown organisational structures for commercial activities. One of the earliest and most ambitious structures was launched in 2016, i.e. roughly one year after the roll-out of the Ethereum blockchain, namely a system of smart contracts that formed a decentralised autonomous organisation (DAO).

DAOs are "sophisticated arrangements of rights and powers encoded through smart contracts that emulate the attributes and activities of business entities or regulated financial contracts, including insurance, futures, options, etc." (Hinkes 2016).

The initiators of the first DAO launched their DAO with the name "The DAO" on the Ethereum blockchain in April 2016 (Jentzsch n.d. [2016]). The aim of The DAO was to emulate a kind of investor-directed equity crowdfunding or venture capital scheme (Waters 2016; Bramanathan 2016). Some of the outstanding features were its open-source architecture, its financing by the then largest-ever crowdfunding campaign (attracting 11,000 investors and a capital of approx. US$150 million in exchange for DAO tokens) and the fact that The DAO is not a corporation. It has no legal personality and is not registered or licensed anywhere (although it operates in the highly regulated finance industry). Its governance system has no managers or board of directors but only "shareholders". A group of "curators" prepares the investment decisions of the shareholders by "whitelisting" investment projects, i.e. by the verification of the identity of fund seekers, the legality of proposed projects, and the viability of their business plan. Investment decisions are then taken by direct majority voting. "Each investor has a voting share that is proportional to the amount of tokens … held. The voting investor has the ability to irrevocably vote once per proposal" (Hinkes 2016). A decision on an investment project requires a majority of votes which also represents at least 20 per cent of the DAO tokens.

Before it became operational, The DAO imploded in June 2016 after an attacker leaked about one third of its funds to a subsidiary account where the money was frozen, i.e. nobody had access to it under the existing code. The remarkable point is that the attacker did not manipulate the code but used a specific routine (a "splitting function") embedded in the code in a way quite different from what the programmers had intended (Greenspan 2016). In other words, the code worked exactly as prescribed, but it produced results different from what was intended. "The issue … was a divergence of software developers'

complex intent, having a specific use in mind for the splitting function, and the de-facto result of the software implementation" (Buterin 2016).

In a stylised form, a DAO as a collective investment venture consists of a moderator and participants. The moderator communicates the idea of the scheme with some information on the envisaged types of investment projects. Participants (= DAO token holders) install (open-source) software that establishes the investors' network and facilitates the project presentation and selection by majority voting. By purchasing DAO tokens, they contribute to the capital of the investment pool, and they may be known only by their Ethereum blockchain address. They do not have an explicit contract with the moderator who organises the presentation of investment projects. The investment projects could be of any permissible type. DAOs of this type pose challenges to regulators and lawmakers, as the DAO is not registered anywhere, does not have a legal personality and may be composed of members in a variety of jurisdictions who are only known by their blockchain address. There is no central authority in a blockchain-based DAO that could stop a self-enforcing process even if it becomes apparent that the results are contrary to the intentions of the parties involved.

In total, regulators who have a mandate for consumer protection and fighting against money laundering and financing of terrorism may want to get some control of the activities of DAOs with such characteristics. As long as DAOs are not incorporated, a regulation and monitoring of a corporate body is not possible. However, DAOs do not evolve spontaneously but are intentionally designed by identified individuals or corporates who provide the required software and organise the collection of funds, e.g. by a token sale. This is a leverage point for regulatory action. The United States Securities and Exchange Commission (SEC) investigated whether the unincorporated organisation The DAO or its creator, the German corporation Slock.it, had violated federal securities laws (Securities and Exchange Commission 2017, hereinafter referred to as SEC 2017). Slock.it had organised the initial sale of The DAO tokens globally but did not register with the SEC and did not submit a statutory prospectus. Thus, the creator of The DAO would have violated US law if The DAO tokens had been classified as securities. The Securities Act of 1933 (as amended) provides a long list of financial instruments and contracts that are securities, including "investment contracts". The SEC stated that an "investment contract is an investment of money in a common enterprise with a reasonable expectation of profits to be derived from the entrepreneurial or managerial efforts of others" (SEC 2017: 11). The purchasers of DAO tokens certainly expected profits from their participation in The DAO, and they relied on the managerial and entrepreneurial efforts of the creator of The DAO and the curators who screened and submitted proposals that should generate profits for The DAO's investors. The legal status of The DAO or the curators was not of relevance in this context. The SEC also clarified that an "investment of money" does not need to take the form of cash. What counts is the contribution of value (here: Ether) that can be invested. Hence, the SEC concluded that the registration requirements

> apply to those who offer and sell securities in the United States, regardless whether the issuing entity is a traditional company or a decentralised autonomous organisation, regardless whether those securities are purchased using U.S. dollars or virtual currencies, and regardless whether they are distributed in certificated form or through distributed ledger technology. In addition, any entity or person engaging in the activities of an exchange, such as bringing together the orders for securities of multiple buyers and sellers … must register as a national securities exchange.
>
> *(SEC 2017: 18)*

It is important to note that the SEC only analysed whether The DAO tokens were investment contracts. Its conclusions apply only to tokens of this particular type, not to tokens in general. Hence, tokens with a particular design are securities while other tokens with a different structure possibly are not. The SEC report does not address other legal and regulatory issues of DAOs.

Smart contracts and DAOs require Sharī'ah clarifications

Whether smart contracts are legally binding and enforceable is a major legal issue in secular as well as Islamic law. It was not until the nineteenth century that a clear definition of a contract was to be found in the treaties of Islamic law (Bakar 2008: 48), but since then a number of essential elements for the validity of a contract in Islamic law have been stipulated, including offer and acceptance, subject matter and consideration (Kamali 2000; Saleem 2013). Contractual innovations are possible as long as they do not get into conflict with explicit prohibitions in the Qur'an and Sunnah. It seems that DApps and DAOs can have features that violate essential elements of a valid contract, particularly under Islamic law. To support the application of smart contracts in the Islamic finance realm, Sharī'ah experts should clarify which formal requirements are indispensable, how they are to be understood in a digital world and where creative leeway exists for new procedures and innovative contractual arrangements. A few examples shall illustrate the issues.

Smart contracts define a sequence of decisions and actions which could be understood as the combination of two or more contracts in one. A Sharī'ah compliant "combination of contracts leading to novel structures or for the development of a financial product is permissible so far as each of the combined contracts fulfils the requirements of a valid contract" (Arbouna 2007) and is not contingent on another contract. Hence, a clarification by experts in Islamic law in a language well understood by computer engineers and software developers could be useful to avoid an impermissible contingency of one contract upon another in a complex system of smart contracts.

A requirement of a valid contract is the offer and acceptance during a session in which the contracting parties come together at a meeting place. While "meeting place" initially meant a location and "coming together" a

face-to-face contact, this has been adapted to take account of communication technologies that allow for virtual meetings of absentee parties. The meeting place has become a timespan for offer and acceptance (Alzaagy 2007). In spite of these adjustments to the digital age, a valid contract still requires human beings as contracting parties. The legal status of an agreement between a human being and a computer is not clear, especially in cases where the computer is actually a DAO that has the capability of autonomous decisions within a given range of alternatives. Furthermore, the rapid development of machines with artificial intelligence (AI) makes it possible that robots interact and negotiate terms of contracts and execute transactions accordingly with no human interference.

A third example shall draw attention to the issue of *gharar*, i.e. contractual uncertainty. It is possible that homeowners produce more electric power from solar panels than they consume and feed the surplus into the local electricity grid. Smart contracts manage this process: they determine qualities and negotiate prices on an automated power exchange. Even if the terms for the infeed as well as the mechanisms for the price determination are known to all parties involved, this system of smart contracts may fall short of two essential elements of a valid contract, namely a clear ex-ante determination of the subject matter, i.e. the quantity of the delivered electricity, and the consideration, i.e. its price, if that is determined and continuously adjusted on the basis of actual supply and demand on an automated exchange. This may be *gharar* of an unacceptable dimension, invalidating the whole contractual arrangement.

These examples shall not imply that sophisticated smart contracts necessarily violate stipulations of Islamic contract law, but they present cases where violations cannot be ruled out. The Sharīʿah (non-)compliance of contractual arrangements is by no means self-evident for non-experts in Islamic law such as software developers who program the smart contracts and machines with AI. The examples illustrate the need for some authoritative explanations and clarifications, i.e. a kind of textbook of Islamic law for a highly digitised world.

Even the first edition of such a textbook should cover decentralised autonomous organisations of a The DAO type. Experts should discuss Sharīʿah qualities of blockchain-based collective investment schemes where all transactions between fund seekers and fund providers are made online (e.g. via a crowdfunding platform). It would be sufficient for the functioning of such a system that the parties involved know each other only by their cryptographic identity. It has been accepted by Islamic jurists that one contracting party may be represented by a technical device such as a vending machine, but the human buyer can get the name of the seller from the machine (while the seller does not get any information about the buyer). However, it is not clear whether contracts can be valid if neither party knows the corporeal or corporate identity of the other party. As the example of the electricity sale indicates, it is conceivable that not only one party is represented by a technical device, but both parties. Can two computers conclude contracts that are valid under Islamic law?

If the identity issue is ignored, The DAO resembles in Islamic law a contractual business partnership (*sharikat al-ʾinan*), but with several peculiarities. The parties involved did not sign a (paper or electronic) partnership contract. When they joined The DAO, they did not know what assets would be purchased by the pooled investment funds. Information and management rights were extremely reduced or non-existent in The DAO compared to a *sharikat al-ʾinan*, and majority voting is not the basis for decision-making in the Islamic partnership.[14] Once a majority vote is taken, the provided funds are blocked without an individual release mechanism. The only exit option would be the sale of The DAO tokens on the secondary market (if it exists). On top of this, the possibility of a "mission drift" has to be considered: the founders of a DAO may advertise it as an "Islamic" collective investment scheme that will invest only in Sharīʿah-compliant projects and securities, but it may turn out through the voting that the majority of the DAO members have a lax understanding of Sharīʿah compliance which clashes with stricter Sharīʿah interpretations of a minority. In the worst case, investments selected by the majority may be deemed Sharīʿah non-compliant by the minority. With no explicit contracts, no legal personality and no management structures of the scheme, outvoted members will be in a very uncomfortable situation when their capital is stuck in doubtful investments. It would be interesting to learn from Sharīʿah experts whether a collective investment scheme with such qualities and the participation in it would be deemed permissible from an Islamic law perspective.

Decentralised intelligent autonomous organisations

The DAO was autonomous as an organisation, but it required human intervention for the identification and selection of investment projects. Technically, it is possible to reduce the need for human interventions further or even to eliminate it completely. The automation and optimisation of investment decisions are the concern of fintechs working in big-data analytics and AI. "As soon as multiple smart contracts are linked and combined with big data analytics and artificial intelligence, it becomes possible to create complex structures that execute automatically once multiple pre-conditions are met" (Rijmenam 2017). The result of a merger of smart contracts and autonomous organisations with machine learning and AI could be a "decentralised intelligent autonomous organisation" (DIAO).

Characteristics of big data

The steep rise in the use of the internet and mobile communication devices resulted in an unprecedented growth of the volume of data "about people's lifestyles, movements and past behaviors" (Finlay 2014: 2). A likewise rapid drop in the cost of data storage and increase in computing power made it technically possible and economically viable to process large volumes of structured and unstructured data for commercial purposes. "[B]y the early 2010s 'Big Data' had become the popular catch-all phrase to describe databases that are not just large, but enormous and complex" (Finlay 2014: 13).

Big data datasets can have a size of multiple terabytes and petabytes of structured and unstructured data of various sources. The data are often generated at high speed (or continuously) and require real-time analytics to be of commercial value. Raw data need to be pre-processed (e.g. connected, cleansed, transformed) before they can be fed into analytical models (Gandomi and Haider 2015). "The principal goal of Big Data processing is refining and extraction of important information, or discovery [of] hidden meanings, leading to important information" (Skyrius et al. 2017: 470). A prominent aim of big-data analysis is the forecast of market developments. Suitable and technically prepared data become inputs of predictive models which use statistical techniques and machine learning algorithms to predict future outcomes.[15] Machine-learning algorithms facilitate the continuous processing and evaluation of new data, including information on the predictive accuracy of the model. These are used for automatic adjustments of the statistical procedures to improve the outcome. The machine learns autonomously (i.e. with no or very limited human intervention) from its own experience to improve the accuracy of predictions or – more generally – the quality of solutions for a given problem such as workflow optimisation, energy conservation, waste prevention or the maximisation of sales proceeds.

Autonomous intelligent trading robots

In finance, AI and machine learning are applied, among others, for capital optimisation and portfolio management. The "computerisation of markets has made it possible for AI algorithms to interact directly with markets, putting in real-time complex buy and sell orders based on sophisticated decision-making, in many cases with minimal human intervention" (Financial Stability Board 2017: 9, hereinafter referred to as FSB 2017). "Machine learning can be used to create 'trading robots' that then teach themselves how to react to market changes" (FSB 2017: 17). "Machine learning can also support portfolio management by identifying signals from big data on which predictions relating to price level volatility can be made, over various time horizons, to generate higher and uncorrelated returns" (FSB 2017: 18).

From a legal perspective, trading robots can be seen as intelligent and autonomous agents: an intelligent agent is capable of learning and "modifying itself, its behavior, and its responses in response to its experiences with the environment" (Chopra and White 2011: 9). Autonomous agents are capable of planning and

> can construct action sequences to achieve tasks using a wide variety of algorithmic techniques to handle uncertainty in their environments. Thus agents possess a goal-directed nature: a final result may be specified and an agent … can autonomously decide how to carry out the task given its resources and the features of the environment; it can select among the various choices available to it along several dimensions of preference.
>
> *(Chopra and White 2011: 9)*

Regulatory concerns of decentralised intelligent autonomous organisations

All technical ingredients for smart contract systems of the next generation – decentralised intelligent autonomous organisations (DIAOs) for wealth optimisation by securities trading – are already available today. Nevertheless, serious regulatory concerns and legal issues still have to be addressed.

A conceptual problem of machine learning is that machines can only learn from the past, and the self-adjustment of AI systems will improve the quality of predictions only if the identified structures of the past keep their predictive power in the future. This cannot be taken for granted when machine learning is mainly based on data from periods of low volatility while markets in the future are characterised by higher volatility and the occurrence of tail events.

If trading based on machine learning outperforms other strategies, it can be expected that more and more traders will switch to similar machine learning strategies. Such a herding behaviour can create stability risks by amplifying shocks. This is highly probable when all traders apply very similar machine-learning programmes from the same third-party software providers and feed their algorithms with more or less the same financial data.

AI can identify correlation patterns in data that cannot be recognised by traditional methods, and this capacity is further improved by the algorithmic learning. However, correlations do not explain causalities and identification is different from interpretation. "Many of the models that result from the use of AI or machine learning techniques are difficult or impossible to interpret" (FSB 2017: 33). The algorithm that determines how the machine can learn to improve the quality of its predictions may be known to a human observer. If the machine gets the information that its last prediction was poor, it has different possibilities to improve the quality of the prediction. For example, the machine could reconsider the old data and modify the weights of some parameters so that its statistical engine generates an ex-post prediction that matches the actual numbers better than its previous prediction. The machine could also analyse an extended data set which includes those data that were received after the initial prediction was made, then re-run the pattern recognition and come up with a better prediction. It could also apply a mix of these two procedures. A human observer can see that the machine has generated a better ex-post forecast but cannot determine how the machine has achieved this result. As the computer code allows various procedures, an inspection of the code cannot answer the question why the robot made particular decisions that generated the observed outcome.

The lack of interpretability of machine actions in combination with the herding behaviour of traders makes it very difficult, if not impossible, to anticipate how a robot trading system will react on systemic shocks.

If several traders apply autonomous AI trading systems, the result will be transactions among learning machines in black boxes, not comprehensible for a human observer. It will be impossible for traders to explain the reasons for the buy and sell decisions of their machines and how their robots did interact.

Legal challenges of decentralised intelligent autonomous organisations

The lack of interpretability of machine actions implies a lack of human control over the outcomes of machine trading. The machine learning could, for example, lead to an assessment of investment risks by the robot that differs from the assessment by the human trader. This can result in investment decisions of the robot that the human trader would not have taken. This possibility cannot be ruled out, but since decisions are taken in a black box, it may only become apparent by the trading results which cannot be revised. The technical agent may or may not make decisions in compliance with the will of its human master. A whole bunch of legal questions comes into sight, and they become even more complex if the machine trading takes place in an autonomous organisation with no explicit legal personality and management structure such as The DAO. The following legal issues are relevant in secular law as well as in Islamic law.

Artificially intelligent trading robots cannot only buy and sell securities at predetermined terms. They can also negotiate autonomously important contractual terms such as prices. In legal systems where the adherence to formalities is of high importance, the legal status of such contracts may be problematic because the artificially intelligent autonomous robot does not have a legal personality and its principal may not even be aware of contractual details negotiated by the robot. As mentioned earlier, an algorithm of an artificial agent may produce decisions which the principal himself would not have taken, e.g. selling securities which the principal would have kept. One may say, with a little exaggeration, that the robot's decisions were not in the interest of the principal as the principal himself understood his interest.

Trading robots may produce poor market predictions, especially when market conditions change fundamentally and in an unprecedented way (so that there is nothing comparable in the machine-learning data). Investment decisions based on faulty predictions can produce large losses. If a trading robot is used by a financial firm to manage clients' money, the questions of responsibility and liability become quite complex. Could clients, for example, argue that the firm violated its due diligence obligation and charge it for negligence because the firm did not control the learning processes of the machine? Would the fact that the learning of the machine has effectively become uncontrollable give the firm relief or additional strain? Can the firm or the clients charge the software company which produced the robot's algorithm on the basis of product liability laws for a malfunction or design defect? Do secular liability laws match liability stipulations in Islamic commercial law, taking into consideration that the damage was caused by an agent that has neither a legal personality nor property of its own?

Interacting trading robots could produce outcomes that would be considered collusion by competition laws if they were the result of human action (FSB 2017: 26). Collusive behaviour can be sanctioned by law if it is intentional. But do intelligent machines have intentions? If not, does it mean that they cannot

collude? Could humans or corporates be made liable for collusion-like behaviour of their robots? Can providers of machine learning software be charged if their programmes facilitated the collusion-like behaviour?

The project selection in an "algorithmic DAO" is delegated to a robot and widely out of human control. This implies considerable uncertainty for the participants on how their funds will be invested. Muslim investors should seek legal advice whether this uncertainty is to be classified as *gharar* and what implications this has for the permissibility of (a participation in) an algorithmic DAO. An organisation with no management, but only with providers of funds and holders of voting rights (who are not shareholders in the usual sense) is quite different from all forms of partnerships developed or adopted by Islamic law. However, companies with limited liability were also alien to the traditional Islamic law in the past and are now accepted. Whether a similar assimilation of decentralised intelligent autonomous organisations with non-ownership structures into Islamic law will occur, remains to be seen.

Chopra and White (2011: 23) have suggested "to consider a wide variety of artificial agents as legal agents of their human or corporate principals. Such a treatment is the most coherent way to fit them into existing legal schemas without extensive doctrinal change". This would provide a consistent legal underpinning for widespread practices such as the de facto ubiquitous conclusion of contracts by robots and other artificial agents. Considering the technical or artificial agents as legal agents gives them a legal personality. Without this, they are legally mere "things", and things cannot conclude contracts – only persons can. If artificial agents become legal agents, they will be subject to a wide range of legal provisions, including contract law, agency law and tort law. This approach is not without challenges in Western law, but it seems worth considering. A utilisation in an Islamic context has to take into account specificities of the concept of legal personality in Islam (Almajid 2010), the Islamic contract and agency law (Al-Zuhayli 2003) and tort law (Mohamad 2015). It is noteworthy that similar legal issues did already exist in antiquity where slaves did business with free men but also with other slaves on behalf of their masters. A slave could act in a way that the master would not consider in his interest, for example by exceeding authorised limits, causing damage to business partners or third parties, etc. The Roman law found flexible solutions for many of these issues (Katz 2008) while Islamic law seems to be somewhat more restrictive regarding slaves in business (Brunschvig 1960, pp. 28–29 [section 3.h.]). Nevertheless, it may be inciting to harness old legal doctrines for very modern technical issues.

The Financial Stability Board (2017: 38) summarises the major legal issues as follows:

> Regarding legal liability, there may be questions on the allocation of responsibility among suppliers, operators and users of AI and machine learning systems – for example the responsibility of a manufacturer or distributor of a financial product that is based on third party data input

> devices or algorithms. There are difficult liability issues, including the extent to which humans may be entitled to rely on expert systems in a wide range of settings. Such liability issues will become increasingly important as artificial agents perform a broader range of tasks currently performed by humans, with the potential for mistakes and for legal disputes around damages.

The smart contracts of the next generation will be decentralised, artificially intelligent and – at least to some degree – partially autonomous. Not only computer experts and financial service providers but also Sharī'ah scholars and Islamic jurists should prepare for this future.

Conclusion

Recent developments in the field of blockchains, cryptocurrencies, smart contracts and intelligent agents have attracted the attention of practitioners and proponents of Islamic finance as well as Sharī'ah scholars. While the distributed ledger technology of blockchains seemingly does not pose serious challenges from an Islamic law perspective, cryptocurrencies that might be, or become, money – such as bitcoin – have evoked serious controversies. Contradicting judgements are less due to differences in Sharī'ah interpretations but mainly caused by divergent technical understandings and economic assessments of cryptocurrencies. More in-depth analyses might lead to more differentiated but consistent views on issues such as the speculative dimension in the pricing of bitcoin, the zakātability of cryptocurrencies and other digital assets or the appropriate *zakāt* rate.

A blockchain is the carrier and tokens are the transactional medium of computer code known as "smart contact". A smart contract is a self-executing and unstoppable series of actions in response to an external trigger event. Jurists have discussed differences between such an arrangement and a valid legal contract. The combination of smart contracts allows the creation of DAOs that can behave like corporations without a human executive board and a legal personality in the traditional sense. Nevertheless, they can enter into contracts or contract-like arrangements that have built-in conditionalities with other parties – including other DAOs – and negotiate autonomously crucial terms such as prices and quantities with no human being involved in offer and acceptance. Software developers may need guidance by Sharī'ah scholars on restrictions and requirements that must be observed when utilising smart contracts and autonomous organisations in Islamic finance. This requires a mutual understanding and common language of computer and Sharī'ah experts that cannot yet be taken for granted.

DAOs start actions with a given set of behavioural rules, but once artificial intelligence capabilities (such as self-learning) are added, DAOs can mutate into intelligent agents which can change their behavioural rules in response to their own experiences. While a smart contract produces deterministic results, actions

of intelligent agents produce only probabilistic results. This creates a host of legal issues when the results do not meet the expectations of the natural or legal persons who brought the intelligent agents to life, or when the results cause damages to them or third parties. The range of issues discussed by conventional lawyers, jurists and lawmakers includes a producer's liability of software developers, third-party liability of the originators and users of intelligent agents and a liability of the (for now) legal non-person agent itself.

When it comes to the law of agents and of legal persons, Sharī'ah has some peculiarities and differences to secular law. Before coming to legal conclusions, Sharī'ah scholars must familiarise themselves with the technicalities of artificial intelligence and the amazing degree of autonomy that decentralised self-evolving organisations can achieve. Although activated by a master, these intelligent agents are no longer under his or her direct control, and – unlike human agents – it is in most cases pointless to impose sanctions on them in cases of "misbehaviour". Analogies to the classic Islamic laws of agents and slaves (who were legal non-persons) in commerce may provide some inspiration for the development of a concept of contemporary intelligent agents from a Sharī'ah perspective, but there seems to be a need for more fundamental conceptual innovations. In general, it may be time to develop a Sharī'ah-compliant cyberlaw, complemented by a Sharī'ah-based cyberethics.

Notes

1 For statistics on bitcoin and other cryptocurrencies see https://bitinfocharts.com.
2 For more details see https://digiconomist.net/bitcoin-energy-consumption.
3 See also https://en.bitcoin.it/wiki/Proof_of_Stake.
4 Bitcoin has a maximum speed of 7 transactions per second, Ethereum around 20, PayPal processes on average 193 payments with a peak of 450, and Visa has reported 1,667 transactions per second as the average of 2016 and 56,000 transactions as a possible maximum (Vermeulen 2017).
5 It may be that one site is the target of links from more than one of its successors.
6 Another exception is the first site which cannot send any arrows forward.
7 "Cryptokitties are feline blockchain-based collectible units … that can be bred (created) and traded (bought-or-sold) on an ethereum blockchain. Launched in October, 2017 … the game has garnered more than $10 million dollars worth of trades, with feline units of Cryptokitties amounting to $100,000 or more in value … The average sales price, however, is roughly $100 per kitten. … The popularity of Cryptokitties has in fact put bandwidth pressure on the entire Ethereum network, at occasions drawing more than 10% of the network bandwidth" (Cohan 2017: 2).
8 The website www.stateofthedapps.com/ lists close to 1,800 DApps designed for Ethereum (as of 9 August 2018) of which more than 730 fall into the categories "games" and "gambling" while 550 are classified as "exchanges" and "finance". Not all designed DApps will finally be launched.
9 Source of data (also 2018 data later in this paragraph): www.coindesk.com/ico-tracker/.
10 "A recent study, based on publicly available information and sources, claims that nearly 80 percent of the initial coin offerings (ICO) are scams, and only a meager 8 percent of the floated ICOs manage to reach the trading stage on the various cryptocurrency exchanges" Seth 2018).

11 www.masjidramadan.org/donate.php. The website does not provide any information on the zakātability of bitcoin holdings and, if zakātable, on the appropriate *zakāt* rate.
12 On specificities of the Ethereum transaction fees – "gas" – see tomshwom 2017.
13 www.cryptokitties.co.
14 "It is … possible that one or more partners run the business while the rest may not participate. Partners are considered agents for each other whereby an action done by one of them in the ordinary course of business binds other partners" (Saleem 2013: 99).
15 For a "formula-free" survey of the basics of the most commonly used types of predictive models see Finlay 2014; for a kind of "formula-loaded" textbook see Larose and Larose 2015; for a summary of analytical platforms in an IT perspective see Skyrius et al. 2017.

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14

THE POTENTIALS OF SMART CONTRACT IN ISLAMIC TRADE FINANCE

Leisan Safina and Umar A. Oseni

Introduction

Since the early days of Islam, trade has always been part and parcel of Muslim's lives. It has been one of the praiseworthy sources of earnings in Islam among other lawful professions. The early Muslims engaged in commercial transactions not only in the Arabian Peninsula but far beyond its borders. They reached East Africa, West Africa and East Asia, resulting in the simultaneous spread of Islam into those regions, which was mirrored in the ethical rules of the ensuing commercial transactions. The success of such trade acumen was underpinned by strong Islamic ethical values introduced to societies often plagued with pre-Islamic exploitative practices. Instead of discrimination, violation of others' rights and other unjust practices among the people, Islam introduced the preservation and enforcement of property rights, sharing profit and risk, exercising high ethical standards, promoting social justice and sanctity of contracts and upholding justice in market transactions (Askari et al. 2010). These great reforms revealed to Prophet Muhammad (pbuh) through the Qur'an and his binding historical legal precedents (Sunnah) introduced a new economic order, which later became the basis of modern Islamic finance. The modern Islamic financial services industry has been growing so fast that its total assets reached USD1.89 trillion in 2016 (Islamic Financial Services Board 2017).

The development of the Islamic financial services industry benefited Islamic trade which, in turn, could serve as the driver for further development of Islamic finance. Trade finance facilities offered by Islamic banks have always played a significant role in facilitating sale/export and purchase/import of machineries, goods, inventories, replacements, spares, raw material and semi-finished goods. As revealed in a report, the largest portion of trade transactions are done either through a bank as an intermediary (35 per cent) or by an open credit

arrangement (about 45 per cent); while direct cash payment, where no financing is used, represents a small portion of international trade (about 20 per cent). In 2016, the volume of global trade finance was USD12.3 trillion,[1] while Islamic trade finance was only USD186 billion which is equal to 1.5 per cent of global trade financing[2] (Thomson Reuters and DinarStandard 2017).

Furthermore, Islamic finance could tap 20 per cent of total global trade finance but the current Islamic trade finance market still remains non-competitive and fragmented (Thomson Reuters and DinarStandard 2017). Additionally, the environment for Islamic banks that are actively engaged in international Islamic trade finance has been changing fundamentally over the last few years particularly since the Global Financial Crisis of 2007–2008. The most important dimensions are regulatory framework, customer experience and technical innovation (Islamic Financial Services Board 2017).

Against this backdrop, this chapter examines technical innovations and financial technologies, particularly, the potentials of smart contract in reshaping Islamic trade finance. After this introduction, part twoof this chapter examines modern Islamic trade finance practices with a focus on products, problems and prospects. Part three focuses on smart contract and its current application in the finance industry. Part four presents the process of smart contract implementation in Islamic trade finance with a proposed model of new smart platform and relevant discussions on legal implications and Sharī'ah aspects of the model. The final part provides a conclusion and some areas for further research.

Islamic trade finance: Products, problems, prospects

Besides the conventional trade finance products and services, the Islamic framework consists of a web of contracts that are exclusive to Islamic trade finance. However, the use of a contract for a particular Islamic trade finance product and the structuring of such a product varies from one bank to another. The mainstream contracts used in Islamic trade finance include *wakālah* (agency), *bai' al-dayn* (sale of debt), *mudārabah* (trust partnership), *mushārakah* (joint venture partnership), *murābahah* (cost-plus sale contract), *ujrah* (fee-based contract), *kafalah* (guarantee contract), *wadi'ah* (safe custody contract) and commodity *murābahah* (in form of monetisation or liquidity) (Abdul Rahim 1990). Though the detailed analysis of the foregoing forms of Sharī'ah contracts transcends the scope of this chapter, it suffices to highlight that different jurisdictions have adopted various forms in structuring their Islamic trade finance products used by Islamic banks in cross-border transactions.

It is pertinent to also note that the classification of Islamic trade finance varies from one author to another due to the emergence of different approaches. Gündoğdu (2016), from a risk management perspective, categorised Islamic trade finance products into two main forms: asset-backed and asset-based products. Oseni (2013) classified international Islamic trade finance from the legal perspective while focusing on the financial intermediation functions of Islamic

financial institutions, where Islamic bank may be an agent, partner, guarantor or seller/buyer of goods. In addition, some Islamic banks proffered some kinds of classification of their Islamic trade finance facilities on their respective websites, while others just enumerated the types of Islamic trade finance products and services they offer. For instance, Alliance Islamic Bank Berhard in Malaysia subdivided Islamic trade finance into import services, import financing, export services, export financing and structured financing. Another Islamic bank in Malaysia, AmBank Islamic Berhard, divides trade finance solutions into non-financing solutions, financing and supply chain. While Dubai Islamic bank (UAE), based on who approached the bank (an importer or exporter), subdivides trade services into imports and exports. It further enumerates the range of the products under each division. Noor Bank (UAE) subdivides trade services into import services, export services, documentary collections and guarantees. Ahli Bank (Qatar) offers import services, export services, guarantee services and financing as trade finance products and services. The Commercial Bank of Qatar's trade services and products include import and export finance, vendor support, document preparation, shipping guarantees, receivable services and letters of guarantee and credit.

As is seen, banks use more practical and convenient approaches for their customers in the classifications. Despite the diversity in the classification of Islamic trade finance, the main products and services are Letter of Credit-i, Trust Receipt-i, Accepted Bill-i, Documentary Bills for Collection-i, Export Credit Refinancing-i, Shipping Guarantee-i and Bank Guarantee-I (Faigah Syed Alwi 2012).

Even though the products used in Islamic trade finance by Islamic banks were adopted after the requisite Sharī'ah approval had been obtained, there are still a number of operational issues in practice. Alwi et al. (2016) highlighted two main Sharī'ah issues in the operation of Shipping Guarantee-i (SG-i). First, there is a possibility of non-existence of goods during the execution of Letter of Credit (LC) *murābahah* financing between an Islamic bank and its customer after issuing SG-i. Second, there is the non-existence of expiry date of guarantee and no limit of the guaranteed amount. This is basically *gharar* or exposure to excessive risk clearly prohibited under the Sharī'ah. Third, the imposition of fees for guarantee remains a controversial issue among Sharī'ah scholars, particularly the third-party guarantee, even though it is acceptable to some Muslim jurists (Issoufou and Oseni 2015). According to the majority of Muslim scholars including the Malikis, Hanafis and Hanbalis, fees for guarantee is considered to be non-Sharī'ah compliant (Ibn Qudamah 1968; Al-Buhuti 1982; Mohd Noor and Haron 2011; Mak and Nemeth 2012).

The Organisation of Islamic Cooperation (OIC) Fiqh Academy and the Accounting and Auditing Organisation for Islamic Financial Institutions (AAOIFI) do not allow charging a fee for a banking guarantee; only the actual cost incurred including administrative or secretarial expenses can be imposed on a customer (Accounting and Auditing Organization for Islamic Financial

Institutions 2014). In Malaysia, imposing a fee on a banking guarantee is allowed based on the conversion of *kafalah* (guarantee) to a *mu'awadah* (exchange contract) (Mohd Noor and Haron 2011). Nevertheless, Syed Alwi (Faigah Syed Alwi 2012) highlighted a number of operational issues such as conversion from *wakālah* model to either *murābahah* or *mushārakah* in LC-i; the practice of instructing the title of goods in the bill of lading to be made out to Islamic banks order in LC-i (*wakālah* and *murābahah*); charging fee in LC *murābahah* by Islamic banks; imposing fee on Banking Guarantee-i, which is actually higher than the incurred cost; the excessive uncertainty in Shipping Guarantee-i due to non-statement of the time frame and guaranteed amount.

Syed Alwi et al. (2015) examined Islamic Trust Receipt (TR-i) and pointed out that including a letter of hypothecation into *murābahah* TR-i defeats the nature of *murābahah* contract. In TR-i (*murābahah)*, an Islamic bank first purchases goods from an exporter with the establishment of the LC *murābahah* or Inward Bills for Collection-i, then sells the goods to its customer. Therefore, issuing the letter of hypothecation is not necessary based on the fact that an Islamic bank is not the owner of the goods. All these issues raised in the current practices in Islamic trade finance relate to the intermediary or the fee to be paid for such intermediation by third party. One wonders what the structuring of the various products would look like if such intermediaries were removed from the product spectrum and the associated fees avoided.

Though these challenges are still being discussed among the stakeholders in the industry, there is a need to forge ahead and signal a paradigm shift in Sharī'ah-compliant trade financing. The ability to change and adopt new technologies will determine the future of Islamic finance generally, and in particular, Islamic trade finance. Unfortunately, there has not been any study on the potentials of smart contract in enhancing Islamic trade finance. This chapter, therefore, will fill the gap by examining potentials of smart contract in Islamic trade finance as well as possible legal and Sharī'ah implications of the implementation.

Smart contract and its application in the finance industry

A brief overview of smart contract

Since Chapter 13 has comprehensively analysed the nature and dynamics of smart contract, a brief general overview is given here to ensure a proper flow of ideas in this chapter. To recapitulate, smart contract stems from the idea that code can execute and enforce the terms and conditions of agreements without or with minimum additional inputs from the parties (Surujnath 2017). The technology that enabled smart contract is the blockchain – a public distributed ledger, which records transactions without a central authority (Dai et al. 2017). Blockchain, in simple terms, is a ledger or a chronologically recorded database of transactions with a number of advantages in comparison with traditional database (Peters and Panayi 2016).

As earlier mentioned, smart contract is self-executed contracts uploaded to blockchain and programmed in code, embodying the terms and conditions of an agreement in the form of "if–then" statements. The exploration of the advantages of blockchain technology is considered to be vital in order to avoid the confusion with traditional databases. This helps to build trust in blockchain within the market. Based on stored data in any database there are five genres of databases, which are: relational databases, key-value stores, columnar, document and graph databases. Additionally, databases can be distributed over many sites and connected by a computer network or centralised system residing at a single site (Peters and Panayi 2015). This study focuses only on distributed databases, as they are closer to the blockchain concept.

The main objective of any distributed databases is to divide large information into smaller pieces to process them more efficiently. In such a scheme, a user is normally not aware of the distribution proportions of data across the different computers/nodes and there is no need for nodes to be homogenous in terms of the stored data (Elmasri and Navathe 2011). Even though the distributed databases have several advantages, such as improved availability, reliability, performance and easier expansion of the data, there is still the issue of the modification that should be done within the database. The traditional approach to solving this issue is to use the "master-slave" relationship, where first a master database should be updated and then propagated to the various "slaves". Even though it solves the issue, using this type of mechanism can become a bottleneck for performance. In multi-master replication modifications, there is an issue of simultaneous distribution of the same data by two different masters (Peters and Panayi 2015).

It is therefore important to examine the difference between blockchain and traditional distributed databases. Blockchain technology will not allow double entrance of the same transaction and, second, blockchain can create self-enforcing contracts that will modify the blockchain's data automatically (Peters and Panayi 2016). That was achieved by combining many old technologies that were used even before the inception of blockchain (Laurence 2017), including public key encryption infrastructure (PKI), hash function and digital time stamping. The PKI is a method of cryptography which uses two types of keys. The first key is called a public key and known to everyone in the system. And the second key is a private key known only to its recipient and securely held by the software. A sender encrypts a message into an unreadable "cipher text" by using mathematical formulas or algorithms in order to secure the data. The "cipher text" can be decrypted into a readable text only by using a private key of the recipient. This technology makes it extremely difficult to reverse a public key into a private key and get the access to the message (Smart Contracts Alliance and Deloitte 2016).

In a smart contract based on blockchain technology, PKI can be used also to verify that the smart-contract transaction was initiated by the initiator in possession of the private key and the message contents are authentic. For this, an initiator who is willing to trigger a smart-contract transaction on the relevant ledger uses its address to send an initiating message encrypted with its private key to

other participants. The participants, with access to the public key of the initiator, pick up the message and verify that the message was sent by the initiator in possession of the private key and the data is authentic and reliable (Smart Contracts Alliance and Deloitte 2016).

The message sent by the initiator should be verified by other participants in the system to be added to the existing chain of blocks. There are various models for that process where the choice is typically based on the type of blockchain. If it is a smart contract based on permissioned blockchain, an administrator or any other authorised participant(s) verifies the transaction, or consensus protocol might be used. And if it is based on permissionless blockchain, typically the blockchain's applicable consensus protocol determines the process of creation of new block and its validation (Smart Contracts Alliance and Deloitte 2016). As of today, there are six types of consensus protocols, which are: proof of work, proof of stake, proof of activity, proof of burn, proof of capacity and proof of elapsed time.

The choice of consensus algorithm largely depends on the type of entries. Some blockchains are storing data or securing systems and contracts, while others are trading values. For example, cryptocurrency such as bitcoin, which is also based on blockchain technology, is trading the value of its token between its members on its network. Each token has a market value, which means the requirements relating to consistency, performance, scalability, threat model and failure model are higher. The main assumption is that there will be hundreds of attackers attempting to corrupt the history of transactions in order to steal tokens. And the degree of trust is extremely low or there is no trust at all. To solve these issues, bitcoin uses a consensus model called "proof of work". On the other hand, financial transactions where parties are known can be recorded on blockchain with lighter and faster consensus mechanism, as the speed of a transaction is more important. Proof of work is too slow, costly and the number of participants within the network is limited for financial transactions in comparison with the bitcoin network (Laurence 2017).

Apart from PKI, the security of the information stored in blockchain is provided through hash functions – the tool for efficient searching of data in a set of records. A hash function is "any function that can be used to map data of arbitrary size to data of fixed size where the output is a bit-string known as the hash value, hash code or hash sum" (Peters and Panayi 2015). Hashing is not new in itself, as it was created over 30 years ago. In blockchain a hash plays the role of glue or it mathematically chains one block to another and as a result it creates mathematical trust. This is due to the fact that it creates a one-way function which cannot be decrypted. Every block within the chain contains the data. A hash function, using this data, creates a mathematical algorithm by mapping this data, which can be of any size, to a bit string of a fixed size. A bit string is 32 characters long and represents the hashed data. In blockchain, the Secure Hash Algorithm (SHA) is used which generates an almost-unique, fixed-size 256-bit (32-byte) hash (Laurence 2017).

The digital time-stamp information records the temporal existence of a particular blockchain ledger item at a given instance in time, digitising that a contract has been initiated or completed, the payments have been done, etc. Normally, a digital time stamp includes the hash information created from the activity of securing any particular information/data entered into the ledger (Peters and Panayi 2015).

If PKI, hash function and digital time stamp are the underlying technologies of blockchain technology, which is the basis of smart contract, Oracle is the technology which connects smart contract with the outside world by providing reliable information for smart contract execution. The process is based on multi-sig or the requirement to sign a transaction for a given account with multiple signatures before it is accepted. Oracle references an agreed-upon data source and, if the required conditions are met, oracle signs the transaction with its private key to effectuate the transaction (Surujnath 2017).

A real-life example of using oracle is air travel insurance. Airlines, by law or contract, are compelled to compensate for any delay, whether it is 15 minutes delay or 10 hours, or cancelation of the flight. But the process of claiming the money is always a nightmare for air passengers. This has been changed by a new Ethereum-based smart contract, Dapp – FlightDelay. The process of application is extremely simple. A customer inserts the details of the flight, such as origin, destination airport and the date, but the departure time should be at least more than 24 hours in the future. Then the Dapp calculates the probability of delay or cancelation of the flight as well as the estimated pay-outs in the case of the respective delays or cancelation and displaces it to the customer. The customer may choose the different amounts of premium varying from 0.5 ETH up to 5 ETH per policy. As was mentioned previously, smart contract based on blockchain is not linked to the outside world. Here oracle comes into the picture to bridge the smart contract with the internet. The oracle uses the trustworthy publicly available data to trigger the insurance policy. In this case, the delayed or cancelled flight is a matter of fact and public record and not based on anyone's assessment (Karpischek 2016). A similar connection between smart contract and the outside world may be explored for any new model for Islamic trade finance for initial acceptability and trust. It is possible to use such technology for customer due diligence in Islamic trade finance.

Smart contract in the finance industry

In the finance industry, smart contract has been attracting the attention of industry players. Though the potential benefits of smart contract in finance have been examined in some studies, there is a very limited number of published articles, reports and white papers on the application of smart-contract technology in the financial services industry and in trade finance in particular. Most of the existing studies focus on the potentials of, or case studies on, smart contract in financial services (Schneider et al. 2016; Surujnath 2017; Ream et al. 2016; Fanning and

Centers 2016), which can be divided into four groups: first, capital markets and investment banking including corporate finance (Initial Public Offers, private equity), (syndicated loans and leveraged loans) and stock exchange market infrastructure. The second group comprises commercial and retail banking including trade finance (supply-chain documentation, invoicing and payments), mortgage lending, loans and crowdfunding for start-ups and SMEs. The third group consists of insurance, including automated claims processing in motor insurance, crop insurance, etc., fraud prevention in luxury goods and new products such as insurance for the sharing economy, autonomous vehicles, peer-to-peer insurance and cyber insurance. The fourth group comprises RegTech or more efficient regulatory and compliance functions (Cant et al. 2016).

Apart from case studies, there are other studies on potential dollar benefits of smart contract in financial industry, and the results are staggering. For example, only in investment banking, corporate clients in trading and settlement of syndicated loans will benefit from shorter settlement cycles, from the current 20 days and more down to 6 to 10 days. This could increase the demand for an additional 5 per cent to 6 per cent resulting in additional income of about USD 2 billion to 7 billion annually in US and Europe (Cant et al. 2016).

Even though smart contract will have a great impact on the financial services industry, some studies have highlighted the challenges and risks associated with it such as technical issues (irrevocability, inability to integrate external data sources, limited use of distributed ledger technology today and the requirement of the complex skill to develop and deploy smart contract system) and various legal issues from choosing a court for dispute resolution, choice of law, compliance with regulatory requirements and regulatory access and visibility up to the limited number of lawyers with required coding skills (Institute of International Finance 2016). Smart Contracts Alliance & Deloitte (2016) described a number of vital features of blockchain technology from a financial application perspective, such as data integrity, permissioning, data security and data authenticity and at the same time regulating requirements relating to account provisioning blockchain solutions for financial asset reporting (Peters and Panayi 2015).

In summary, smart contract technology is still at an early stage of development and further research is required to improve its security and efficiency. Existing studies highlighted many opportunities as well as challenges. Most of them are of the opinion that blockchain technology, including smart contracts, with its various types of applications, will not completely replace any aspect of financial services, but it will definitely reshape business models of financial services industry and enhance efficiency (Guo and Liang 2016) and the other group of researchers considers that blockchain-based smart contracts will revolutionise many industries, including the banking industry (Zhao et al. 2016).

In the conventional trade finance industry there have been several attempts to bring paper-intensive Letter of Credit into blockchain. An innovative start-up company, Wave, in collaboration with Barclays, executed letter-of-credit transaction on blockchain technology in late 2016, cutting a process from the

normal seven to ten days to less than four hours. The transaction was executed via a blockchain platform set up by Wave which provided an electronic record-keeping and transaction-processing system. The platform enabled the involved parties to track documentation through a secure network where no third-party verification is required. As a result, almost US$100,000-worth of butter and cheese from Ireland were imported to the Seychelles Trading Company. Actually, the platform made it possible to transfer the insurance, shipping and other original documents by means of the blockchain technology. The other interesting case of real blockchain usage in the settlement of trade was done by the Commonwealth Bank of Australia and Wells Fargo to ship US$35,000-worth cotton from Texas in the USA to Qingdao, China. The transaction was successful, but the banks admitted that they were not ready to launch it into a full blockchain (Smart 2016). The main concerns to be addressed are legal, regulatory and others.

Smart contract in Islamic trade finance

Smart contract based on blockchain technology has great potential for Islamic finance and can transform its business models solving many issues faced by financial institutions and regulators. The adoption of this technology may vary from one country to another based on its regulatory framework, geography and complexity of assets managed. Considering the fact that trade settlement is still done through physical or electronic documents' exchange, smart contract represents a great opportunity to break away from this inefficiency by digitising its operations and substantially cutting the operational costs, reducing error rates and accelerating the speed of trade settlement process.

Implementation of smart contract in Islamic trade finance

Smart contract's potential for disruption of Islamic trade finance goes beyond simple digitisation of Islamic trade finance products and services. It requires fundamental rethinking of the business model and flows of information (Brunner et al. 2017). For example, first, instead of thinking of how to digitise LC-i, it is better to think whether the market needs it at all. Second, new Islamic trade finance based on smart contract should not represent an isolated piece of the value chain focusing on bill of lading or LC-i, but rather be a one-stop solution with the main objective of improving customer experience through transparent, fast and cost-efficient transactions; third, improving the product features from a Sharī'ah perspective; and fourth, there should be an entire paradigm shift from the current limited set of clients who can afford Islamic trade finance facilities offered by Islamic banks to the platform being easily accessible to any importer and exporter regardless of the volumes of their transactions and the country of origin but with one condition, that the goods must be Sharī'ah-compliant. Based on these arguments, smart contract-based Islamic trade finance should be

a platform with the end-to-end collection of information through sensors, smart input mechanisms and real-time data processing (Brunner et al. 2017).

There are many types of smart contracts which vary in their operations. Taking into consideration the technical advice of researchers as well as professionals from various fields through published articles, whitepapers and reports, we consider that a private permissioned smart contract will be the most suitable for Islamic trade finance. The basis for such opinion is contained in the features of private permissioned smart contract. The private permissioned smart contract can ensure and provide a private, secure and scalable platform connecting all stakeholders of the process including the transacting parties – an exporter and importer, and other important parties such as customs, logistic companies, Islamic banks, takaful companies and others (Cant et al. 2016). In addition, a smart contract based on permissioned private blockchain makes it possible to comply with anti-money laundering and anti-terrorism financing regulations. It also allows for the traditional KYC procedure of approved users to undertake operations in a particular space (Peters and Panayi 2016).

The platform will provide application programming interface (API) for the standard creation of a contract. Importers and exporters without any knowledge of coding will be able to use ready and predefined templates or building blocks enabling the creation of contracts (Brunner et al. 2017). In special cases, the process may require the help and assistance of developers and other professionals including lawyers and financial experts as well as programmers.

At the initial stage, we believe it is better not to completely do away with the traditional legal documentation used in Islamic trade finance. There could, however, be a gradual phase-out of the traditional documentation while the market expands and trust is built into the new system. Apart from the digitisation of the Islamic trade-settlement process, the new smart Islamic trade-finance platform will enable tracking the process of trade settlement on a real-time basis, from the day of contract creation up to the delivery of the goods to the importer. This becomes possible with the incorporation of Internet-of-Things (IoT) devices into a container which allows the monitoring of the temperature, humidity and the location of a container on a real-time basis and inform the parties of any kind of contract breach in terms of temperature or humidity by displaying the responsible parties. Additionally, an embedded GPS device may be linked to a smart contract which triggers the trade contract to self-execution upon the arrival at the right location.

Furthermore, it is therefore relevant to discuss the detailed steps of the proposed process from contract creation to execution. The process starts with the negotiation of the agreement by an importer and exporter. The parties agree on terms and conditions of the contract including the quantity and quality of the goods which must be Sharī'ah-compliant, the mode of payment, shipping company, trade route, takaful coverage and company and other relevant terms. The relevant companies will already be registered in the system so that an importer and exporter can choose by selecting the required parties on the platform.

Payment can be made in two ways: either funds are transferred and kept in the escrow account until the goods leave the port of the exporting country or funds will be released to the exporter by smart contract upon the completion of the whole shipping process. It should be mentioned that if the importer and exporter set the range of temperature and humidity level inside the container, the logistic company bears the responsibility of maintaining it, otherwise fines may be imposed on it by smart contract, which should be self-executing as well.

Once all terms of the contract have been identified and agreed by the exporter and importer, the importer initiates smart contract on the platform where there is an express offer. The blockchain generates the unique address of the contract (an alphanumeric character uniquely allocated to it by the software) which is used to send initiating messages and to generate private and corresponding public keys for the members. After the importer has initiated a new smart contract for the settlement of Islamic trade, the smart contract sends the invitation to the exporter. The exporter registers into the contract and verifies the terms of the contract by using its private key. This represents acceptance, and this initial process is considered the contractual session (*majlis al-aqd*) where all terms are finalised. The inputs are recorded on a distributed ledger. After that, all other parties will be included and the formation of the smart contract concluded. Every participant has its own set of public and private keys used for validation. Once the event occurs and the content has been verified by a validator using its private key, the smart contract protocol automatically performs a stated contractual action which is recorded in the block and added to the chain. As mentioned earlier, the smart contract should not completely replace the required legal documentation. For that purpose, international standard documentation could be relied on. The documents should be linked within the blockchain via a time-stamped hash. Additionally, the smart contract provides data for regulators and auditors to fulfil the compliance requirements and reporting.

1. An importer and exporter agree to the sale of products at a future date and time.
2. The importer requests financing from a bank. Alternatively, the importer might use its own funds for the payment, which will be also held in the escrow account.
3. The bank provides the financing which is kept in escrow account and, upon crediting the money, the bank validates the smart contract by using its private key.
4. The exporter initiates the shipment. The container will be recorded on the distributed ledger which generates its unique code labelled on the container. The IoT devices enable online tracking of the container across the world.
5. The inspection company checks the goods for alignment with the terms of the contract and signs the smart contract with its private key.
6. Local customs "A" in the export country inspects the goods based on the country code and verifies with its private key.

7. The goods are transferred from country "A" to country "B" by freight and local customs "B" inspects the goods based on the country code, and verifies it by its private key.
8. Following the inspection, the goods are delivered to the importer who verifies the delivery by signing with its private key.
9. Once the goods are delivered and the importer has full ownership of the goods, the smart contract will automatically release the funds to the exporter. Note: all steps upon the verification by a validator are recorded on the distributed ledger.

The earlier-described cycle of Islamic trade settlement is not the only possible one. There might be many other varieties based on importer and exporter choice. The crucial part is that a new smart Islamic trade settlement platform will solve many issues related to Islamic trade finance, one of which is lack of trust between buyers and sellers, the gap between when the payment is made and the goods are shipped. And it will help avoid many unnecessary expensive Islamic banking products.

Just like its conventional counterpart, the main obstacle in Islamic trade has been the issue of trust, where exporters and importers do not know each other and are located in different countries. The only way to solve this issue is by involving financial intermediaries, which has proved to be costly. Such intermediaries often include: Import bank, Correspondent Bank, Export Bank, Issuing Bank, Advising Bank, Confirming, Nominated Bank and Reimbursing Bank. The proposed smart Islamic trade settlement will remove all these banks from the contractual relationship between the importers and exporters. In fact, most Islamic Trade Finance facilities used today may become irrelevant. The only exception might still be the financing facility, as importers and exporters need to obtain cash from financial institution. As a result, Letter of Credit-i (*Wakalah*), Inward Bills for Collection-i (*Wakalah* and *Ujrah*), Outward Bills for Collection-i (*Wakalah* and *Ujrah*), Shipping Guarantee-i (*Kafalah*), Bank Guarantee-i (*Kafalah*) may no longer be necessary. And in case of Letter of Credit-i (*Murabahah* and *Musharakah*), it is the combination of financing and guarantee where the guarantee part would become irrelevant or as an option it can be replaced by other modes of financing. Above all, associated costs of such products are completely reduced.

Legal and Sharī'ah implications of smart contract in Islamic trade finance

Regulatory frameworks and laws are often outpaced by technology. The same trend is observable in the case of smart contract in distributed ledgers. The ability of smart contract to interoperate with the existing legal system is crucial in the development of the technology. Based on this, there are several points of smart contracts that require due diligence from a legal and compliance perspective.

First, smart contracts are irrevocable once the code has been written. This may create practical issues in real life. Non-smart contracts have provisions for modifications, amendment or cancellation. According to a Cornell University Professor, Ari Juels, there may be an encoded escape hatch to change the terms of contracts in a lawful and mutually beneficial way with the condition that the right permissions are incorporated into the escape mechanism in the correct way (Cant et al. 2016).

Second, adjudication and legal enforceability raise further concerns. Here it should be determined whether a smart contract is a legally enforceable contract. In determining the enforceability of smart contracts in distributed ledger, one would easily consider such contracts as enforceable in the same way and manner traditional contracts are. Remedies for specific performance might not be available, since the underlying contractual theory of smart contract is that it is self-executing. However, parties may claim damages for breach of contract in the event that the self-execution of such contracts does not fully cater for the damage incurred. In essence, in a smart contract based on blockchain technology, a contract can be considered to be a legally enforceable contract, as it is a programme written by a user in order to perform transaction(s) with other user(s) on the blockchain, where the other users accept the terms of the contract with the intention of entering into a contract in return to get pre-agreed consideration. Since the platform is based on permissioned blockchain, only a person who is of the age of majority can register there. In addition, a smart contract can be considered enforceable, as there is an offer, acceptance, consideration, intention to create legal contract, capacity to contract and free consent. These are not only required under the conventional contractual arrangements but also under the Sharī'ah.

Another issue that arises is whether a smart contract is allowed under e-commerce legal regimes of different jurisdictions. The answer is in the affirmative. Most e-commerce legislations allow the communication of proposals, acceptance of proposals and revocation of proposals and acceptance or any related communication electronically. Such laws further acknowledge that a contract shall not be denied legal effects, enforceability or validity on the basis that an electronic message is used in its formation. As long as legally able persons have reached an agreement, regardless of whether verbally agreeing, physically or electronically signing something, the contract is legally credible, valid and enforceable. Furthermore, such laws state that being electronic cannot be the basis for dismissing electronic contracts. However, it is vital that contracting terms should be clearly spelled out in the programme, be understandable, precise and clear for the parties of the contract to validly accept the terms.

In the case of the Ethereum platform, a user-friendly interface was launched in early 2016 allowing almost anyone to create a smart contract. Previous studies show that there is a new programming language for writing smart contract – Pac, where the code is written in human-readable form on the ledger. It means that technically it is possible to create such a platform where the code is understandable

for parties as required by the relevant electronic commerce laws of some countries. In the unlikely event that the law prescribes for a specific form of contract, it is possible to have an additional written contract, which should be linked within the blockchain via a time-stamped hash to ensure its legal enforceability.

Another legal issue that may arise is whether decisions taken by electronic agents through smart contract code have a binding effect on their principals. In the US case of *State Farm Mut. Auto. Ins. Co. v. Bockhorst*,[3] a case relating to insurance business, the court made an insurance company liable for its computerised reinstatement of an insurance policy when it held that: "A computer operates only in accordance with the information and directions supplied by its human programmers. If the computer does not think like a man, it is man's fault". The second important case relating to smart contracts was in the equities market. A customer in an equity market may place limit orders instructing the market maker to trade when the stock reaches a particular price. In essence, the customer provides the terms when the trading contract was executed. The US court did not question whether the customer was bound by the resulting transactions.[4] The above-mentioned cases show that parties involved in a smart contract are legally bound by the decision taken by the electronic agent or smart contract code.

The other related area vital for discussion is disputes arising from smart contract or smart-contract dispute resolution. In the context of disputes, the level of involvement of courts and lawyers will depend on a number of competing concepts. Despite the attractiveness of the certainty provided by smart contracts on distributed ledger, coders will face the challenge of how to encode good faith, fair dealing and other subjective concepts into smart contracts. Handling such subjective matters requires a level of flexibility, and that is why the role of juries, judges and arbitrators will increase. Although it is very unlikely that disputes will disappear, smart contracts will significantly change the methods of dispute resolution and disputes themselves (Koulu 2016).

Lastly, the role of lawyers after or in the process of smart contract implementation, setting and execution needs to be considered. Opinions have been expressed that smart contract on distributed ledger will remove the lawyers and leave final decisions on who wins and loses free from the influence of lawyers. Nevertheless, according to our opinion, smart contract-based Islamic trade finance platforms will have at least a few lawyers to create codes to construct a workable commercial contract. Additionally, some exporting or importing companies might still need lawyers to negotiate terms and perform due diligence. We believe that traditional lawyers will be enough, as the platform will have a few specialised lawyers who provide assurance that the codes are enforceable and embody the intended provisions. Although lawyers will not be excluded from the Islamic trade finance universe, ledger-hosted smart contracts can streamline Islamic trade-finance transactions and potentially reduce the legal expenses of importers and exporters.

From the Sharīʿah perspective, the importance of trade in Islam has been tremendously emphasised as one of the lawful sources of the wealth acquisition

(Hassan et al. 2013). The basis and purpose of the Sharī'ah is a good order of life and wellbeing of human beings (*maslahah*) and the objectives of the Sharī'ah (*maqāsid al-Sharī'ah*) include different dimensions of human needs, and their fulfilment will create balanced satisfaction at the societal and individual levels. With reference to Islamic finance, the *maqāsid* discussion centres around the protection and preservation of wealth (*hifz al-mal*) or fair and smooth circulation of resources in society, enjoying transparent and fair financial practices and establishing socioeconomic justice in the society. The implementation of smart-contract technology in Islamic trade finance is expected to enhance the volumes of trade between both Organisation of Islamic Cooperation (OIC) and non-OIC countries by decreasing cost, alleviating concerns around trust and security, improving the speed of the Islamic trade cycle as well as making it more user-friendly.

The proposed smart Islamic trade-finance platform will improve and solve some of Sharī'ah issues earlier identified in the current operation of Islamic trade finance. Thus, the proposed smart Islamic trade-finance platform will repel the harm previously incurred in Islamic trade-finance facilities offered by Islamic banks. As has been mentioned, a few current Islamic trade finance products offered by Islamic banks will be removed from the trade cycle and among them there are facilities and services which have some Sharī'ah issues in the current practice of Islamic trade finance

However, trade is not a panacea to a country's problem but if it is structured properly in terms of enabling regulatory, legal, financing and settlement architecture and capturing e-commerce and digital opportunities, then it can bring tremendous opportunities to the real economy, alleviate poverty and spur GDP growth. So, the adoption of smart contract on blockchain technology for Islamic trade finance is not just gaining a foothold in the technological revolution, but making Islamic trade settlement one step closer to Sharī'ah rulings and principles. Islam commands honesty, trustworthiness and transparency, which are inherently the basis of blockchain-based smart contracts.

Conclusion

Currently, Islamic banks across different jurisdictions offer a vast variety of Sharī'ah solutions for exporters and importers, which are financing, trade settlement and guarantee products. A new smart platform for executing Islamic trade will be open, transparent and automated so that traders need not rely on Islamic banks as intermediaries to overcome trust issues identified in the current international Islamic trade sector. Such Islamic trade-finance facilities as letter of credit-i, inward bills for collection-i, outward bills for collection-i, banking guarantee-i and shipping guarantee-i will not be relevant anymore, thereby reducing costs and decreasing the settlement period of international trade as well as solving Sharī'ah issues related to these products. The lowered cost and transparency of the platform will enhance trading among Muslim countries.

Since this study provides a preliminary conceptual analysis, further research is required in the field of coding of smart contracts on distributed ledger with more detailed examination of opportunities and challenges on the way to the implementation of the proposed Islamic trade finance framework. Additionally, further studies are required in the field of the legal and regulatory framework of Islamic trade finance in the light of proposed smart-contract–based Islamic trade finance.

Notes

1 The calculation is based on the assumption that the market will grow by 1.2 per cent cumulative annual between 2014 and 2016.
2 Based on the assumption that the share of Islamic trade finance transactions remained the same as in 2014.
3 453 F.2d 533 (10th Cir. 1972).
4 *Newton v. Merrill, Lynch, Pierce, Fenner & Smith, Inc.* 135 F.3d 266, 269 (3d Cir. 1998).

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PART V

Case studies: From concept to application

15

THE EMERGENCE OF ISLAMIC CROWDFUNDING PLATFORMS

A case study of Ethis Ventures

Ahmad A. Sabree and Umar Munshi

Introduction

This chapter examines the business model and strategy of the company Ethis Ventures, based on the rise of its conceptually proven platform EthisCrowd.com. The definition and concept of Islamic crowdfunding will be addressed along with how these concepts are implemented on a practical level. The *mudārabah* crowdfunding structure utilised by EthisCrowd.com will be explained in detail in order to illustrate how fintech facilitates the use of Islamic finance contracts in a simple yet effective manner which remains genuine to the spirit of Islamic principles of finance. Challenges faced by Ethis Ventures in its attempts to expand and grow will be elaborated upon, and afterwards, some ideas about the way forward will be provided in order to present how Ethis Ventures plans to evolve in the future. Lastly, the conclusion summarises the case of the platform, EthisCrowd.com, its development over the past few years and what the future of fintech solutions in Islamic finance may look like.

There are a number of companies and platforms than form the Ethis group. The first is Ethis Pte Ltd, a Singaporean company that owns and operates EthisCrowd.com. This is a real-estate crowdfunding platform which matches investors directly to the platform's project partners. The second is PT Ethis Indo Asia (PT Ethis), a real-estate developer, contractor and agency licensed locally in Indonesia. This company receives foreign investment from EthisCrowd investors to be channelled into the various projects in Indonesia. The third key company is Ethis Ventures Sdn. Bhd. which is a Malaysian company setup as a venture builder and consultant for "Islamic Fintech". Additional Ethis platforms are concurrently being tested and developed as well in various countries including Indonesia, Malaysia, Brunei and United Arab Emirates.

"Ethis" is a combination of the words "Ethical" and "Islamic". Ethis Ventures' vision is to be a premiere facilitator of the development of Islamic crowdfunding by providing the key services new Islamic platforms need to get started and operate smoothly, as well as building new fintech solutions for Islamic financial institutions and other clients. Services provided and activities include:

- Operating own platforms – In addition to EthisCrowd, Ethis Ventures also operates a newer platform GlobalSadaqah.com which focuses on Islamic social finance.
- New platform development – Technology development services for clients to provide platforms to host crowdfunding campaigns, members' dashboard, and effect fund transfers. Ethis-built platforms are focused on simplicity for easy user experience, and automation of communication and work processes.
- Compliance and licensing consultation – Ethis Ventures is one of the few fintech companies that can engage with multiple financial regulators in Asia. Engagements range from full licenses, to sandbox licenses and even proposing licensing frameworks to regulators that have yet to formulate their own guidelines. This experience gives Ethis unique insights and understanding on aligning with regulators and producing licensing frameworks and submissions.
- Full range of business-process outsourcing services for technology companies. This includes digital automation, online marketing and Sharī'ah consultancy.

In terms of expansion, Ethis Ventures has an additional strategy of collaboration through investing in up-and-coming start-ups or providing advisory and strategic support to facilitate their further development. Platforms that Ethis Ventures collaborates with include SkolaFund, a Malaysian charity crowdfunding platform for scholarships, KapitalBoost from Singapore, which focuses on P2P finance for SMEs, KitaBisa which is the largest charity crowdfunding platform in Indonesia, and Yielders, which is the first licensed Islamic Crowdfunding platform in Europe, which also focuses on real estate.

EthisCrowd: An overview

EthisCrowd.com is an investment-based crowdfunding platform that facilitates the process of social impact investing that is Sharī'ah-compliant. The focus of EthisCrowd investments is development of social housing in Indonesia for low-income citizens. EthisCrowd has a community of 25,000 members from around the world who receive curated opportunities featured on the platform, from which they choose to invest in. With every new campaign launched members take the step to become investors as this unique proof of concept becomes stronger. EthisCrowd has won international recognition and awards for the innovative model and the social impact that it has achieved. These awards include the

Islamic Economy Award 2016, the GIFA Best Islamic Crowdfunding Platform 2016 and, most recently, the Dubai Expo Live Innovation for Impact grant.

Indonesia is the world's fourth most populated country, with more than 267 million citizens and 88 per cent of the population being Muslim (Worldpopulationreview.com, 2018). Indonesia is also the country with the largest Muslim population in the world. Indonesia faces a general shortage of funds for social housing and needs foreign investment to fulfil its financing needs. The number of Indonesians who do not own a home is estimated to be 11.8 million (Program Satu Juta Rumah, 2016). In response to this huge deficit, the Indonesian government launched a campaign in mid-2015 called "The One Million Homes Project" (Budi, 2018), which aims to dramatically reduce the number of those in need of homes to 6.9 million by 2019. EthisCrowd has a business focus that directly helps to fulfil this goal and has thus been received positively by government officials in Jakarta, the capital of Indonesia.

The EthisCrowd platform can be considered as one of the pioneers of the concept of "Islamic crowdfunding", which is the merging of Islamic finance with the technology of crowdfunding. EthisCrowd has a business model that serves as a matchmaker between two groups in a unique and innovative manner. The first group is the crowd-investors who have an interest in social impact, Islamic or real-estate investing or a combination of these. The second group is the real-estate developers who are seeking risk capital or bridging capital to advance their projects to being bankable. EthisCrowd serves each of these groups by bringing them together via a digital platform that provides services in a way that is unavailable with traditional finance providers.

The story of EthisCrowd.com begins with Umar Munshi, a serial entrepreneur since the age of 18. Umar had launched various businesses in his twenties, bringing with him experiences in Singapore, Indonesia and Saudi Arabia. By 2014, Umar had experienced several ups and downs in his business endeavours including a major debt as a result of a supplier that went rogue. At that point, he experienced the wrath of the banks that used to treat him so well when he was better-off financially. It was this experience that made him ask: "What does Islam say about finance and interest?" He began learning independently about Islamic finance and decided that he wanted to do something purely Islamic. That led him to pursue the initiation of an Islamic finance consultancy company in his home country of Singapore, to focus on Islamic estate planning and to attract retail Islamic finance providers to offer their products in Singapore. Unfortunately, the market was not mature or large enough for such retail offerings since the "natural" market of Muslims was not only small in population but also largely unaware about Islamic finance. This pushed Umar to his first pivot, to shift focus to organising a series of free Islamic finance educational talks in Singapore, sometimes inviting major Islamic finance scholars from abroad to enlighten the local community about Islamic principles of banking and finance.

As the Islamic finance educational push began to gain momentum, Umar saw a new opportunity: why not create an online platform to facilitate Islamic

investments into businesses that would be permissible for Muslims to invest in? This was the inspiration behind the creation of Umar's first crowdfunding platform, ClubEthis.com, which was essentially a website to serve a private investment club of Islamic finance enthusiasts that engaged in "Structured Community Funding". Umar had been reading about crowdfunding and found that it was an ideal model to facilitate Islamic investment and also easy enough to use that it would be accessible to sophisticated investors as well as regular retail investors. The ClubEthis platform's co-founders were Umar's close friends, including a lawyer focused on Islamic finance in Singapore. ClubEthis received an angel investment early on from Erly Witoyo, a finance professional who had at that time just left Barclays Singapore, where he had been a director of due diligence. Erly decided to invest in, and join, ClubEthis, in order to pursue something that was more in line with his values. Umar's friend and business partner for more than ten years, Ronald Yusuf Wijaya from Indonesia, then opened PT Ethis in Indonesia with the other co-founders, to originate and take part in real-estate development projects. This early setup gained rapid early traction, and would later branch out and evolve to become the EthisCrowd and KapitalBoost platforms that are known today.

The mode of investment in EthisCrowd campaigns has primarily been the Islamic finance contract of *mudārabah*, which is a profit-and-loss sharing agreement between two parties: the investor (*rab al-mal*) and the entrepreneur (*mudarib*). Projects developers provide projections for profits expected from the campaign and then sets a "Profit Sharing Ratio" (PSR), which is the basis of the distribution of profits realised at the end of the campaign. Should the campaign underperform or fail, crowd-investors have to bear any capital loss, and the developer does not get paid for his work. However, if this outcome is a result of the developer's negligence, misconduct or any other breach, they will be liable for the capital and possibly damages as well.

In 2017 a new model based on the concept of *istisna'a* (manufacturing or construction contract) was implemented, where EthisCrowd investors fund the construction of specific housing units through PT Ethis as a co-developer. This is essentially a sale-based model, where, through PT Ethis, investors purchase units with progressive payments to the developer, thus providing the developer capital to finance the construction of the purchase. Upon completion, these units are then sold at a profit. Since the initial purchase from the developer is at a known price and the selling price is fixed by the government, the exact expected profits are known from the beginning. Compared to *mudārabah*, the *istisna'a* model gives more stable returns and involves significantly less project accounting since there is no need to profit-actualise at the level of the project developer.

Unique market gap EthisCrowd fills

In real-estate development, financing is usually from institutional investors or banks due to the high capital requirements. Often, developers with good projects

are not able to raise funds at the early stages of their projects because the banks typically have a lower appetite and capacity to finance such "riskier" phases of projects. Islamic banks do however play a critical role by providing financing to end-buyers of the homes and thus providing the liquidity needed for the final sale. This availability of end-financing is the key driver of the social housing sector and is a direct result of government support and attractive subsidies to banks serving social housing buyers as part of the One Million Homes programme in Indonesia.

Social housing projects typically comprise from hundreds up to thousands of houses in one estate. Developers will build in phases, where batches of houses would be constructed and sold through the financing bank to the end-buyer, and the sales proceeds provide the cash flow to continue building later phases of more batches of houses. The sale processing and payment process, however, takes a few months and may even at times stretch to beyond six months due to various reasons ranging from incomplete applications by home buyers to delays in processing by the bank due to geography or a lack of administrative capacity. Developers who depend on sales cash flow are thus at the mercy of the sales process for their speed of construction. The main avenue for such developers to raise more funds is from private local investors who typically expect very high returns and often there are disagreements when there is a lack of understanding or clear legal agreements in place to protect both parties.

Ethis co-founders Ronald and Umar identified this financing gap and seized the opportunity to fill it through crowdfunding. One of the first few developers onboard was even referred to PT Ethis by a local Islamic bank specialising in social housing financing. This developer was the bank's top client and was seeking funds to construct more houses faster. The EthisCrowd is able to provide bridging capital in a relatively short period of time compared to banks. This is an important benefit and is possible because the process of raising and disbursing funds from the crowd is generally much faster than the banks. Historically, popular campaigns on EthisCrowd are fully funded within a month, with the fastest campaign raising S$500,000 (S$ is Singapore dollars) in just one week! Another benefit EthisCrowd brings together with PT Ethis is the deep understanding and direct involvement in the Indonesian social housing sector. The EthisCrowd platform has proved to be complimentary to Islamic banks in Indonesia by providing bridging finance to construct more houses than they are able to receive from bank financing. The crowd's investment increases the number and speed of houses that are completed.

As a crowdfunding platform, EthisCrowd leverages on the power of strength in numbers with its investors. With such a business model it can accommodate minimum investments as small as S$250 (approximately US$185). By allowing minimum investments this small, EthisCrowd opens the opportunity for investment into large-scale real-estate projects to a wider group of investors from around the world who would have otherwise had no access to such opportunities. In addition, the profit margins of EthisCrowd campaigns, which are on

average between 8 and 12 per cent (on an annualised calculation), are rarely available to the average investor. Additionally, EthisCrowd also attracts larger investors (termed "lead investors") who are seeking alternative investment opportunities. These investors commonly contribute S$20,000 to S$200,000 (approximately US$14,635 to US$146,145) or more to a single campaign and are often offered early access to campaigns with higher profit-sharing ratios than the ordinary crowd. With the combination of lead investors and the "crowd investors", EthisCrowd brings together a wide variety of investor types to invest in social impact projects.

In mid-2017, EthisCrowd also started to receive enquiries and interest both from Indonesian as well as international institutions and fund houses to invest in social housing projects in Indonesia. EthisCrowd has been focused on building the additional capacity and expertise required to serve such large investors and will be embarking on much larger projects in 2019. Institutional funds are also considered part of the crowd and brings a new dynamic as well as much larger scale to the financing ecosystem that EthisCrowd seeks to form.

The second group that benefits from the unique approach to finance that EthisCrowd uses are the real-estate developers. As long as onboarding conditions are met, EthisCrowd will usually finance them in the early construction stages of their projects at a time when banks are not able or willing to provide financing. Generally, what EthisCrowd does is provide funds to help developers reach certain milestones set by banks to help them qualify for financing to complete their projects. In other cases, EthisCrowd may provide the "last mile" financing to help developers finish the last remaining part of a project which may need funds. There are also cases where the developers want to take up financing purely from non-bank sources and EthisCrowd fills that need as well.

Structure

The majority of EthisCrowd campaigns are in Indonesia, where the project financing campaigns are done in collaboration with PT Ethis. In every campaign PT Ethis enters into project SPVs and other arrangements with developers before transferring the funds raised by the investors via EthisCrowd.com. PT Ethis also takes hold of assets, collaterals and the proceeds of secured sales to protect the interests and rights of crowd-investors. Before any campaign goes live, a thorough screening and onboarding process takes place which includes checking the track record of performance and market reputation of the developer. PT Ethis is a member of and works closely with the main developer and housing associations in Indonesia, which provides valuable insights on market conditions and market players. Data and documentation is collected and verified, physical checks and visits are made and, upon final approval, the campaign is sent to the EthisCrowd team to curate and feature on the platform.

Once projects are screened and approved, certain conditions will be set between PT Ethis and the developer in order to further ensure the smooth

running and completion of the campaign. PT Ethis may require a joint venture (JV) company be formed for the purpose of the campaign, or that a minority share of the company and/or financial controller status be given to it in order to monitor and ensure proper usage of the funds coming from the crowdfunding investors. Also, before any campaign can go live, the current and future exchange rates between the Indonesian Rupiah (IDR) and various other currencies have to be considered and hedged to make sure the losses in the case of depreciation of the Rupiah are managed. The campaign is then listed on the platform with the details of how much money needs to be raised and for what purpose. Other campaign details include projected returns based on profit sharing and the estimated duration for the completion of the campaign along with other pertinent details.

The next step in the crowdfunding process is the matchmaking of investors from the crowd to the campaigns. EthisCrowd has over 25,000 members that receive updates on the campaigns curated and listed on the platform. Once funds are pledged, the investor-relations team facilitates the process of investors transferring their investments directly to the Indonesian project bank account. Once the campaign is completed, the houses are sold. The profit from the sale is divided between the developer for services provided and investors based on their PSR.

Over time, EthisCrowd has found various ways to structure Sharī'ah-compliant real-estate investment deals. What follows is an explanation of the *mudārabah* process for launching new crowdfunding campaigns on EthisCrowd.com.

As for the process flow of investments, the *mudārabah* structure in Figure 15.1 is explained with the following corresponding points:

1. A joint venture is set up between PT Ethis and the developer seeking funding. The structure facilitates monitoring of funds that flow from investors into the project. It also gives PT Ethis the right to information and control over the project.
2. At this point, the investments begin to flow in from the various investors globally. However, before any investments can be transferred, a standard "Know Your Customer" (KYC) process is carried out. The operations team at EthisCrowd facilitates the contracts that each investor signs. All contracts are executed using digital e-signing, which can be done on a computer or mobile phone.
3. Investors transfer their investments into a project account controlled by PT Ethis. From this account the funds will be transferred to the developer to execute the project.
4. Once the funds have been received in the JV account, they are channelled into the social impact projects, usually progressively based on agreed milestones. PT Ethis actively monitors the progress of the campaign to ensure that the money is being used for its intended purpose. Once a developer has used one tranche of the funds in accordance with the project description, PT Ethis will release the next tranche.

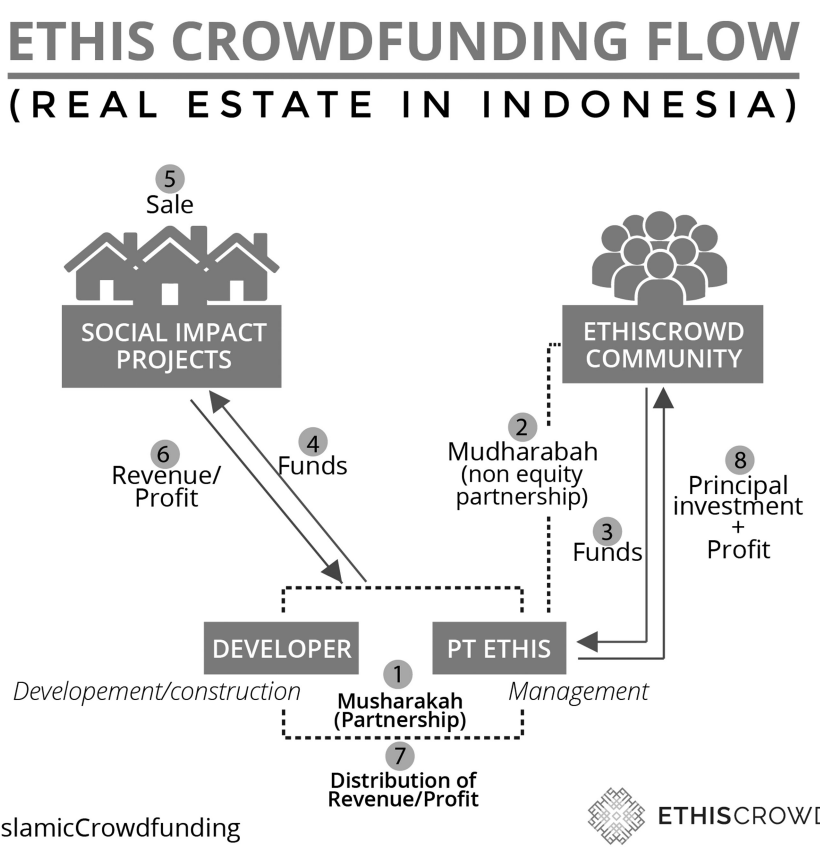

FIGURE 15.1 EthisCrowd *mudārabah* model 2017.

Source: EthisCrowd

5. Houses are sold after buyers are screened and approved for end-financing by partner Islamic banks.
6. Proceeds from the sale are disbursed by the bank to the JV company.
7. The profit earned is shared between EthisCrowd investors and the developer based on a pre-agreed profit-sharing ratio.
8. The portion of the profit earned by EthisCrowd on behalf of investors is distributed to them and comprises of their principal capital plus profit.

Challenges

Throughout the lifetime of EthisCrowd, challenges have constantly arisen, but with quick thinking and teamwork the team at EthisCrowd perseveres to tackle each one. The areas in which challenges have arisen are:

- cash flow;
- talent development; and
- project completion delays.

Each challenge has pushed the company to adapt, expand and reinvent itself in different ways. The following is an overview of some challenges faced by EthisCrowd and the actions taken to overcome them.

Cash flow

Shortages and needs for cash flow are a common thing for start-ups. The standard approach of increasing cash flow by increasing sales is always the primary focus. However, sometimes this method is not sufficient and alternative means of income must be sought.

EthisCrowd is no different from other start-ups in having faced cash-flow issues. The manner in which they were solved was by creating new revenue streams. For example, EthisCrowd has taken its experience with building, maintaining and enhancing its own crowdfunding platform and packaged it as a standalone service where it builds crowdfunding platforms for other companies and organisations. In addition, Ethis Ventures has made significant progress in establishing and maintaining an investor relations team as well as project accounting, Sharī'ah and digital marketing that can provide the same service to clients. This bundle of services has come to be known as the Business Process Outsourcing (BPO) package. This new service has provided Ethis Ventures with new clients and opened up several new revenue streams.

Joint-venture partnership is also an avenue that Ethis Ventures has used to secure additional business. When expanding to new countries, Ethis Ventures always seeks out competent partners who have suitable professional backgrounds to be partners. With the use of licensing agreements, new partnerships have the right to use the Ethis brand and technology in exchange for certain fees. To date, Ethis Ventures has established partnerships in Indonesia, South Africa, UAE, Malaysia and Brunei. Each country has a unique relationship and setup of its platform, but all use the standard layout of EthisCrowd.com.

Each of the strategies mentioned earlier also have challenges embedded within them. Providing BPO services for other start-ups can mean occasional late- or non-payment of fees, when clients may have cash-flow challenges. For partnerships, there is the tricky need to figure out how the Ethis business model fits into different or absent regulatory frameworks. Many entrepreneurs are interested in implementing the EthisCrowd business model in their respective countries, however, they do not have the real-estate market knowledge or experience that is needed to run the platform successfully. In other cases, the experience is there, but the regulators of the country are not familiar enough with crowdfunding or Islamic finance to understand the nature of the *mudārabah* or *istisna'a* products that EthisCrowd uses. Such regulatory challenges can cause major delays,

and therefore the benefit of franchising to such a country is not realised for an extended period of time.

Venturing into new jurisdictions to open new platforms in different countries has given the team at Ethis Ventures valuable experience in dealing with regulators. Many countries have gone the route of opening fintech sandboxes before issuing full crowdfunding licenses. Ethis Ventures has applied for sandboxes in several countries and from each application new lessons are learned. Currently those experiences have started to prove valuable, as some businesses in emerging markets have interest in hiring Ethis Ventures as a consultant to propose new crowdfunding platforms to their regulators. This consulting service bears potential to be yet another source of income albeit on a less long-term basis.

Talent development

As companies grow and progress towards various milestones of achievement, there is a natural need to expand the workforce to be able to handle larger workloads at an optimum level and also to be able to enhance the capabilities of the company.

Ethis was started by four young professionals in Singapore, but gradually each one had to focus on their own business or head in their own direction, which left Umar with the task of rebuilding the EthisCrowd team. His first step was to move to Malaysia, where the Islamic economy as well as the Islamic finance talent pool is vastly larger than Singapore's. The challenge was how to choose the best building-blocks to start a new team. In early February 2016, the first hire was a young African-American man named Ahmad Sabree, who had recently completed his masters in Islamic banking and finance from the International Islamic University Malaysia's Institute of Islamic Banking and Finance with a thesis written on the topic of adapting crowdfunding to support SMEs in Malaysia. Fast-forward nearly two years, and the EthisCrowd Kuala Lumpur team has grown to more than 20 staff, including interns, with a large number of them coming from top Malaysian universities.

This trend shows that being in an area where there is a large talent pool is very helpful for a start-up to source the skilled workers it needs to scale-up quickly without too much time spent on training. The remaining challenges revolved around raising the business-instinct levels of fresh graduate students to those of fast-moving entrepreneurs. One technique to find out if new employees were a good fit was the use of internship programmes by giving candidates a three-month period to learn the business and test how well they can apply their knowledge and skills to the business. At the same time, the seniors of the company can assess whether the candidate is up to the calibre needed in terms of technical skills, attitude and collaborating with other team members. The key characteristic that all Ethis teams look for in new candidates is the ability to go above and beyond the tasks given, to be able to anticipate problems and produce measures to solve them in advance, to be a quick learner, to be independently motivated

and to have the ability to work well and communicate with others. These are skills that cannot be easily taught, and since Ethis has a focus on hiring mostly young professionals who are largely university fresh graduates (the average age of Ethis staff is below 30, with the youngest staff being just 20 years old), candidates must possess natural talent and have a basic level of well-roundedness if they wish to progress to full employment after their internship.

Project delays

Investing in real estate carries the advantage of placing money into a tangible asset that can easily be identified and claimed. This allows the investment to generally be safe from capital loss because rights to land can be sold, usually with appreciation in value over time, even if the intended construction is not successful. Although crowd-investors have to take on the full risks of investing in campaigns, it is in the best interest of the platform to ensure that campaigns succeed. Preventing failure is a priority and the method of doing so is through careful screening of the viability of campaigns and track records of developers before approving them for crowdfunding. However, even with a cautious approach to screening campaigns, unexpected events do happen, and things go differently than planned. One of the most common undesirable situations that EthisCrowd encounters is project delays. When projects are proposed to EthisCrowd by the developers, they include a budget and an expected timeline for completion, but in some cases at a certain point the project development may face challenges leading to delays. For this reason, EthisCrowd always structures a buffer of usually one or two months into the expected duration of the campaign to manage the expectations of the investors and give allowance for the possibility of unintended delays.

The causes of delays vary from unpreventable things like bad weather and span to include things like delays in securing permits and inconsistent reporting or information from developers. In each case EthisCrowd relies on the PT Ethis team in Indonesia to visit the project sites and meet with developers to obtain the details of each case and verify information. Afterwards, the updates are shared with the investors, so they are aware of the status of their investment and the newly estimated timeline of completion. Once a delay happens, the whole team is on alert to watch the project closely to be sure that the new deadline is met. In case there are multiple delays, the EthisCrowd investor relations team may schedule calls with investors to explain the situation in more detail and address any concerns the investors may have.

Project delays can be a source of tension among the company and its clients. No one enjoys hearing that their profits will be delayed, but some investors are more patient than others. Dealing with investors is not an easy task, and in the end as a platform, PT Ethis, together with EthisCrowd, have to also understand and work closely with the developers to help resolve any issues. The measures that EthisCrowd has taken in the past include having developers record videos

of themselves explaining their situations and why they have missed deadlines or milestones. This more personal approach to remedying situations is an additional level of transparency that EthisCrowd finds to be meaningful and helpful in unfortunate situations. There is no guarantee that all investors will be satisfied with the answers as to why the campaigns are delayed, however, everyone is alerted from the website and the contract that as part of the *mudārabah* agreement, total loss of capital is a real possibility and that risks and rewards of campaigns are shared equally among investors and developers. As with any "alternative investment" or real-world business, the risk is considered to be high.

Recent initiatives and the way forward

In the second quarter of 2017, EthisCrowd launched a campaign to assist a developer building social housing units in the town of Depok, in Greater Jakarta. The campaign was for financing the construction of 16 homes in the second phase of a project by a small developer. This project qualifies under government requirement as "social housing". With this status, buyers can obtain bank end-financing with as little as 1 per cent down-payment.

The demand for housing in Depok is very high as it is one of the major satellite towns of Greater Jakarta. Every day, a large number of people commute from Depok to Jakarta for work. This trend has increased the demand for housing in Depok as well as other satellite cities of Jakarta. By financing the developer of the housing project, EthisCrowd is creating social impact by increasing the available number of houses for the 11.8 million people in the country in need of an affordable place to live.

The amount of financing required for the campaign was approximately US$96,000, a seemingly small amount for anyone from a developed country in order to build 16 houses. However, in Indonesia the dynamics of low-cost land, labour and building materials creates a situation where such a thing is possible. The financing amount was provided on a *mudārabah* profit-sharing basis, however to ensure the interests of investors were covered, EthisCrowd secured the rights to eight of the houses through a notarised sale-and-purchase agreement. In addition to that, a separate shared bank account was set up between the developer and EthisCrowd to be used for receiving payment disbursements from the Islamic banks after the end-buyers were screened and approved. With this system in place, for every house sold the exact funds disbursed could be seen by both parties and profits could be split based on the pre-agreed PSR.

From the investor perspective, this campaign was very attractive. In line with the EthisCrowd goal to bring down barriers to real estate investment for small investors, the minimum investment for this campaign was set at S$800 (approximately US$585). The duration was 10 to 14 months and the PSR was 17.65 per cent, which equals to a projected ROI of approximately 13 to 15 per cent. By July 2018 all 16 houses had been built and the pay-out process was 27 per cent complete.

As always in the tech world, disruptions are constant. Even as the current industry leader for real estate Islamic crowdfunding, the team at EthisCrowd is aware that competition can come at any time. The fintech space for Islamic finance solutions has grown considerably since 2015 when there were fewer than ten players to be found. Now Indonesia is showing strong interest in fintech as a whole and fintech solutions in Islamic finance as a major segment. There are several Sharī'ah-inspired fintech platforms in the initial stages that are expected to be fully operational by 2018. For Ethis Ventures and EthisCrowd, the focus is on refining processes and enhancing growth capacity as well as always looking for new ways to add value to the Sharī'ah-inspired fintech ecosystem and continue making social impact globally. Increasingly EthisCrowd uses a combination of the contract of *istisna'a* and *murābahah* (profit mark-up sale). This model will allow for faster closure of campaigns, as the standard profit-actualisation process that is core to *mudārabah* is not needed. While profit-sharing after actualisation is an attractive and endearing model in principle, it is also time-consuming and sometimes difficult since it requires extensive checking of accounts

In the future, Ethis Ventures seeks to explore the usage of blockchain technology for record keeping as well as for other applications. PT Ethis has also started building a specialised mobile application that will allow Indonesian home-buyers, investors, developers and landowners to express their interest in participating in the development of social housing projects.

Conclusion

Between 2014 and 2018, major changes have taken place for Sharī'ah-oriented fintech. During that period, EthisCrowd.com went from an idea, to a real functioning platform, to one of the most recognised Islamic crowdfunding platforms today. Leveraging on the technology of crowdfunding has been the core feature that has put the Ethis brand in a prominent role in the emerging space of Sharī'ah-compliant fintech. In the past, the only major financial institutions Muslims were familiar with were Islamic banks and Islamic fund management companies. Now Sharī'ah-oriented fintech has come onto the scene and opened a new form of alternative financing and investment for those looking for Sharī'ah-compliant options. The use of new technology with the timeless principles of Islam has proven to be a great match for Ethis Ventures and now there are increasingly more platforms that are providing Sharī'ah-oriented fintech services.

Through all the regulatory exposure in Malaysia, Indonesia, Brunei, UAE and others, the Ethis Ventures team has gained global insight into how different countries approach fintech. This puts the platform in an ideally strategic position to mentor other younger platforms and facilitate the growth of the industry. While Ethis Ventures has a leading role in Islamic crowdfunding, the founders have always been in favour of sharing knowledge and experience to grow the industry.

The future of Sharī'ah-oriented fintech (sometimes called "Islamic Fintech") seems bright, as it has come from an unknown term in 2014 to a hot topic by 2018.

Currently, most such platforms have angled themselves to be tailored to Muslim needs. But with the aim of being accepted by a vast array of customer segments, Ethis Ventures has branded itself as catering to both ethical as well as Islamic investors (thus the name Ethis, a combination of the words "Ethical" and "Islamic"). Ethis has committed to the United Nations global compact, in line with making its values and presence known to the wider community of those who are social-impact oriented. Representing Ethis, Umar had in 2016 formed the "Islamic Fintech Alliance", which brings together several of the most prominent Islamic crowdfunding platforms and unifies them on common goals of quality best-practice of Sharī'ah-oriented fintech. The Alliance also serves as a network where knowledge and resources are shared among members as they face different challenges in progressing their platforms in specific and the industry as a whole. With unity among the major players of Islamic crowdfunding and teams of young motivated professionals working on each platform, we can expect Islamic crowdfunding to have a lasting and growing presence in the global Islamic economy.

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16

THE INVESTMENT ACCOUNT PLATFORM

A practical application of fintech in Malaysia

Noor Suhaida binti Kasri and Marjan Muhammad

Introduction: The impetus for the investment account platform

The launching of Malaysia's investment account platform (IAP) in 2016 marked another important milestone in positioning Malaysia as a leader in the Islamic banking industry. For the first time in Malaysian history, six competitive Islamic banks collectively collaborated to initiate and launch the IAP. The multi-bank platform offers multiple ventures or investment avenues for investors to invest in, and financing options and opportunities for ventures to choose from, via the intermediation of the sponsoring banks. The platform that leverages on the advance and innovative financial technology system, or fintech, offers a safe and regulated investment ecosystem with better outreach and enhanced visibility to the ventures while the investors enjoy a greater transparency and disclosure on the listed ventures (Investment Account Platform, 2016). The IAP has introduced a new innovative asset class into the Islamic financial market. Its introduction has developed and strengthened the Malaysian Islamic financial market by garnering investments from institutions as well as retail, which includes high net worth individual investors (Razak, 2015).

What drove and enabled this initiative is the direct support rendered by the Malaysian government where a sum of RM150 million was allocated to start the IAP project. In addition to that, incentives in the form of tax exemption is given to individual investors on profits gained from qualified investment for three consecutive years. Such support is given as IAP is part of the government's strategic agenda to reinforce the growth of the real inclusive economy through bolstering entrepreneurial activities, especially the small-medium enterprise (SME) sectors (Razak, 2015). In essence, Islamic finance has played a critical role in expanding the SME economy. Through Islamic financing, the SME sector has witnessed

an encouraging upward trend of 29 per cent average annual rate growth for the period 2010–2015 (Md Nor, 2016).

The regulatory framework for the investment account platform

The IAP, a web-based platform, is regulated and supervised by the Central Bank of Malaysia (Bank Negara Malaysia, BNM). The offerings and transactions conducted by the Islamic banks or the sponsoring banks on the IAP are governed by the Islamic Financial Services Act 2013 (IFSA) and the Development Financial Institutions Act 2002 (DFIA). IFSA regulates the Islamic financial industry in Malaysia. IFSA reinforces the requirement for end-to-end Sharī'ah compliance in the business, activities and operations of the Islamic financial institutions. It provides greater clarity and certainty of Sharī'ah contractual features in both Sharī'ah and operational aspects (Md Nor, 2016). Ever since IFSA's enactment, the Islamic financial industry has shown an upward trajectory. By June 2017, the Islamic banking industry's total assets reached RM610.52 billion (circa. US$152.63 billion), almost 27 per cent of the total banking system in Malaysia (Md Nor, 2016).

In relation to IAP, IFSA has set an enabling legal framework for the transformation of the traditional role and banking business of Islamic banks. It introduced diversification of Islamic banking business through the statutory recognition of an investment account that is distinct from the traditional Islamic deposit. The diversification has also made a major impact on the role that Islamic banks have traditionally been playing. The role of Islamic banks has been transformed from a mere credit intermediary to a purpose-driven investment intermediary that would ultimately promote real economic growth and development. Thus, the establishment of IAP is expected to accelerate the growth of the investment accounts. Hence an effective operation and management of IAP as an "investment account platform" is vital.

The establishment of an investment account

The introduction of an investment account under the IFSA regime marked another stage in the evolution of the Malaysian Islamic banking industry. As mentioned earlier, IFSA reintroduced or reclassified deposit-taking products into two distinctive classes of assets; namely, an Islamic deposit account and an investment account. An investment account is defined in IFSA as an account into which money is paid and accepted for the purposes of investment, in accordance with Sharī'ah on the terms that there is no express or implied obligation to repay the money in full, and with or without any return.

The earlier definition explicitly distinguishes the character of an investment account from an Islamic deposit account such that the investment account does not guarantee the return of the capital nor profit. The definition embeds

statutorily the true spirit of Sharī'ah-compliant investment, namely, *mushārakah* contract (profit and loss sharing) or *mudārabah* contract (profit sharing and loss bearing) or *wakalah bil istithmar* contract (agency for investment). Due to the risk-sharing nature of the investment account, IFSA stipulates the required legal framework that strengthens the investment account operations. Fundamentally it provides appropriate legal protection to the investment account holders while ensuring financial stability to the Islamic financial system by ring-fencing the assets underlying the investment account in the event of an Islamic bank's liquidation (Bank Negara Malaysia, 2014a). The response from the industry towards IFSA's investment account has been positive. This is evidenced by the total investment account balance that stands as of November 2017 at RM 72,448.93 million (circa US$18,112.23 million), which is 12.84 per cent of the total investment and deposit account balance (Kasri and Ahmed, 2017).

It is worth mentioning that with the reclassification of deposit-taking products into the Islamic deposit account and the Islamic investment account, only the former is eligible for insurance under the national deposit insurance system administered by the Perbadanan Insurans Deposit Malaysia (PIDM or Malaysian Deposit Insurance Corporation). PIDM is a government agency that protects depositors, both individuals and institutions, against any loss of their insured deposits in the unlikely event of a member bank failure, with a maximum of up to RM250,000 (circa US$62,500) per depositor per member bank. Accordingly, any depositor who deposits money using the investment account will not be eligible for such a protection.

The investment account platform

Fintech has facilitated and enabled IAP to offer a speedy and easily accessible online medium or marketplace for the matching of funds between willing investors and willing entrepreneurs, along with their listed entrepreneurships at a lower competitive cost. It is an avenue that offers a wider range of Sharī'ah-compliant investment ventures that are offered/sponsored by the IAP-participating Islamic banks to eligible investors through their investment account placement (Bank Negara Malaysia, 2014b). Through the IAP, investors may diversify their investment portfolio, in line with their risk appetite to exposures of various types of projects, sectors and industries. The returns from these investments would be directly based on the performance of these underlying business ventures. Due to the direct link with the real economic performance, the return (if any) that is shared between the investors and entrepreneurs is expected to be potentially higher than the return of other typical deposit accounts (Jamalluddin, 2015). For instance, Project Ar Rahn ventures gives an expected profit rate (EPR) of 7.5 per cent, the highest among 6 projects successfully funded via IAP. Hence, the rating assigned by the IAP's rating agency, namely RAM Solutions Sdn Bhd on the ventures listed on the IAP, facilitated and enabled investors to make a more informed investment decision on the viability of these ventures.

At the same time, ventures and entities including small-medium size (SMEs) business of varying types, sizes and industries could use IAP as a platform to raise funds. IAP offers greater access to competitive financing package for their projects. This supply-and-demand matching exercise propels financial inclusion for this sector that has traditionally been outside the radar of financial institutions due to the preference for stronger credit-worthy clients. Through IAP, these ventures and entities would be able to promote and advertise their entrepreneurships to the eligible crowd of investors/funders. The general structure of IAP is further illustrated in Figure 16.1.

IAP contractual relationships

The contractual relationships of investors, participating banks and entrepreneurs are structured on a risk-reward or return-based initiatives framework. One set of contracts governs the contractual relationship between the investor and the participating bank while the other set of contracts governs the contractual relationship between the participating bank and the entrepreneur. Thus, to bind the contractual relationship between the participating bank and the investor, the contract used is such that it allows returns generated by the performance of the underlying ventures to be shared between the parties, namely *mushārakah*, *mudārabah* and *wakālah* (Bank Negara Malaysia, 2014a). The contract between the participating bank and the entrepreneur/venture owner will be based on the type of financing entered into between them; for example, it may be a participatory equity financing contract (*mushārakah* or *mudārabah*), lease-based financing contract (*ijārah*), sale-based financing contract (*murābahah*, *tawarruq*, *salam* or *istisna'a*) and fee-based financing contract (*wakālah*) (Jamalluddin, 2015).

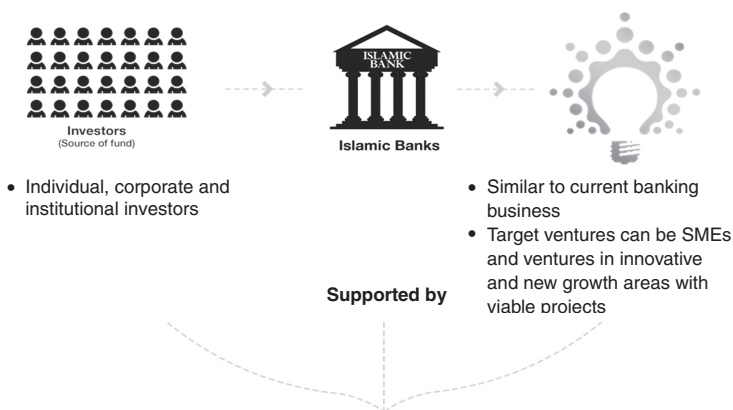

FIGURE 16.1 General structure of investment account platform.

Source: Investment Account Platform, 2016

Thus, to ensure the participating banks perform their fiduciary duty and duty of care effectively in their intermediary role, BNM (2014a) has published a comprehensive Investment Account Policy Document in guiding Islamic banks on operating their investment account portfolio. While the participating banks would be protected from any liability in its contractual relationship with the entrepreneurs, except when the contract is *mushārakah*- or *mudārabah*-based, the banks are still exposed in their contractual relationship to the investors if the losses are proven to be caused by the negligence of the participating banks. The apportionment of such liability to the defaulting participating bank parties is important, particularly so in the case of investment account products, as their capital is statutorily no longer guaranteed.

Therefore, to mitigate the risks of banks being considered negligent, and in line with the BNM Investment Account Policy Document, the participating banks must ensure minimum standards are maintained whilst accepting investment account placements from investors. These minimum standards are, *inter alia*:

i. Conduct suitability assessment to assess eligibility and risk appetite of individual investors;
ii. Provide disclosures on the underlying ventures and their related risk-return profiles;
iii. Recommend appropriate products in line with the investors' risk appetite;
iv. Propose Sharī'ah contracts which will define the intermediary's role and basis for attributing returns generated to the participating banks and investors.

And when applying the funds or channelling the fund from the investment account to finance suitable ventures, the participating banks must ensure to, *inter alia*:

i. Match funds received with underlying ventures according to the investors' investment mandate;
ii. Conduct due diligence on prospective ventures to ensure the risks undertaken are aligned with the investment mandate;
iii. Ensure proper governance to safeguard investors' interests and the participating banks' reputation;
iv. Maintain clear separation of funds to facilitate distributions of principal and returns, especially when there is a winding-up event.

Hence, regular monitoring and reporting on the performance of the ventures to the investors is an important prerequisite. The innovations and advances in financial technology enable participating banks to provide greater levels of transparency in a more timely manner. The protection of the rights of investors, the distribution of profit to investors upon the agreed terms and the identification of

exit mechanisms, and performance of recovery, if required, would enhance the confidence of investors in the IAP model (Investment Account Platform, 2016).

Successful ventures funded via the IAP

As at December 2017, six projects or ventures have been successfully funded through the IAP. These ventures can be broadly categorised into three types, i.e. cooperative, corporation and SMEs businesses, as summarised in Table 16.1.

A highlight of each category of the successful ventures is presented in the following subsections.

Cooperative: Kobimbing

Koperasi Kakitangan Kumpulan BIMB Holdings Malaysia Berhad (Kobimbing) was incorporated in 1987 as a cooperative business society. Its members comprise the staff of BIMB Holdings Berhad's group of companies (BHB Group), which consists of Bank Islam Malaysia Berhad (BIMB), Syarikat Takaful Malaysia Berhad, BIMB Securities Sdn Bhd, BIMB Investment Management Berhad and Farihan Corporation Sdn Bhd. The main activity of Kobimbing is the extension of Islamic personal financing to its members in which the repayments are done via non-discretionary salary deductions. Kobimbing had 2,669 registered members as of 14 October 2016. The members can obtain financing up to 30 times their gross salaries, with repayment periods of up to 10 years. Using *wakalah* as the underlying Sharī'ah principle, Kobimbing raised RM6.0 million (circa. US$1.5 million) funds via the IAP on 14 November 2016. Table 16.2 presents brief information on the Kobimbing business venture.

TABLE 16.1 Ventures funded through IAP (as at December 2017)

Category	*Details*	*Sponsoring bank*
Cooperative	Kobimbing by Koperasi Kakitangan Kumpulan BIMB Holdings Malaysia Berhad	Bank Islam Malaysia Berhad
Corporation	Project Transit by Perak Transit Berhad (PKTB)	Bank Muamalat Malaysia Berhad
	Project Ar Rahn by Muamalat Venture Sdn Bhd (MVSB)	Bank Muamalat Malaysia Berhad
SME	Rental of Notebook @ ICT by ICT Zone Ventures Berhad	AFFIN Islamic Bank Berhad
	CMC Group by CMC Group Sdn Bhd	Bank Islam Malaysia Berhad
	SURIA (Specific Unrestricted Investment Account) – A portfolio of selected non-retail financing assets	Maybank Islamic Berhad

TABLE 16.2 Brief information on Kobimbing Venture

Description of the venture	**Koperasi Kakitangan Kumpulan BIMB Holdings Malaysia Berhad** The financing to the venture is in the form of Business Financing-i Facility (using ***tawarruq***) of up to RM6.0 million (with a profit rate of 6.8% per annum).
Type of investment account	**Restricted investment account (RIA)** refers to a type of investment account where the IAH(s) provides the bank with the mandate to make investment on his behalf, in financing the venture.
Applicable Sharī'ah contract	*Wakalah* where the customer(s) (i.e. investment account holder[s] or IAH[s]) appoint Bank Islam Malaysia Berhad (Bank Islam/the Sponsoring Bank) as the agent to invest the funds provided by the IAH(s) to finance the venture with a view of earning profits and the bank will receive fee for the agency services provided. Among the mandates given to Bank Islam as the agent are: (i) to take appropriate actions on behalf of the IAH and to exercise all rights, remedies and discretions as specifically delegated to or vested in the agent under the general terms and conditions of the contract. (ii) to administer their investment on their behalf. (iii) to exercise and carry out all the discretions, authorities, powers and duties conferred or imposed by the general terms and conditions of the contract. The IAH as principal shall indemnify the agent against any loss and/or damages due to or arising from the acts of the agent except those loss and/or damages resulting from the agent's misconduct, gross negligence, willful default, omission, fraud or non-compliance with regulatory requirements.
Parties involved in the investment	(i) **Bank Islam** – the investment agent (ii) **The IAH(s)** – the investor(s) (iii) **The venture** – the party that receives the financing (Kobimbing).
Investment tenure	Five years.
Expected profit rate (EPR)	6.60% per annum The agent will pay any profit generated from the investment in the following circumstances: If the actual profit is **equal to or above** the EPR, the agent will: (i) pay the expected profit rate to the IAH(s); and (ii) any excess thereof, will be treated as performance incentive for the agent; (iii) if the actual profit is **below** the EPR, the agent will pay the actual profit rate to the IAH(s); or (iv) any loss shall be borne solely by the IAH(s) provided that such losses are not due to the agent's misconduct, negligence or breach of specified terms of the investments.

(*Continued*)

TABLE 16.2 (CONTINUED) Brief information on Kobimbing Venture

***Wakalah* fee**	0.2% per annum based on the outstanding total fund size.
Profit payment frequency	Monthly.
Redemption/ withdrawal	Early redemption or withdrawal of investment prior to maturity is not allowed.
Reinvestment	Not allowed.
PIDM coverage	Not insured.

Source: Adapted from the IAP website

Corporation: Perak Transit

Perak Transit Berhad (PKTB) is a big corporation which was incorporated in Malaysia on 5 September 2008 under the Companies Act 1965 as a private company limited by shares. It was subsequently converted to a public company and renamed itself from Perak Transit Sdn Bhd to Perak Transit Berhad on 26 March 2010. PKTB is a result of the merger and integration of a bus consortium formed under The Combined Bus Services Sdn Bhd in 2010 together with three other operating bus companies. PKTB's principal activity is investment holding, while its group of companies is involved in the operations of an integrated public-transportation terminal, the provision of public bus services and the petrol sales business via operations of several petrol stations in different parts of Malaysia. On 26 April 2016, PKTB raised an amount of RM10.0 million via IAP using the principle *wakalah*, similar to Kobimbing venture, to finance its working capital requirements. Salient features of the PKTB business venture are presented in Table 16.3.

Small-medium enterprise: ICT zone

ICT Zone Ventures Bhd (ICT) is an SME which was incorporated on 28 January 2010. Its principal business is in information- and communication-technology equipment rental operations. ICT started its business selling projector equipment, which later developed into a leasing and factoring business, for which a license is granted under the Financial Services Act 2013. The transformation of its business from mere selling of projector equipment to leasing and factoring was due to the increase in the demand for ICT equipment on a rental basis. Hence, it started offering long-term rental for a period of up to three years. Through its strategic alliance, ICT has been able to tap both the government market and the corporate sectors. To match the capacity to supply and meet the demand of the contract that it procured, ICT has used IAP. Through IAP, ICT has raised 70 per cent to part-finance its capital expenditure related to a contract awarded to ICT Zone, under the principle of *mudārabah muqayyadah* (restricted *mudārabah*). Table 16.4 presents an overview of the ICT Zone venture.

TABLE 16.3 Brief information on PKTB Venture

Description of the venture	**Perak Transit Berhad (PKTB)** The financing to the venture is in the form of working capital (term financing facility using ***tawarruq***) of up to RM10.0 million (with a profit rate of bank's base financing rate [BFR] + 0.10% per annum).
Shari'ah contract	*Wakalah* where the customer(s) (investment account holder[s] or IAH[s]) appoint Bank Muamalat Malaysia Berhad (Bank Muamalat/Sponsoring Bank) as the agent to invest the funds provided by the IAH(s) to finance the venture with a view of earning profits and the sponsoring bank will receive fee for the agency services provided.
Type of investment account	***Wakalah* restricted investment account (WRIA)** refers to a type of investment account where the IAH(s) provides the sponsoring bank with the mandate to make investment on his behalf, in financing the venture.
Parties involved in the investment	(i) **Bank Mualamat** – the investment agent (ii) **The IAH(s)** – the investor(s) (iii) **The venture** – the party that receives the financing (PKTB).
Investment tenure	Three years.
Expected profit rate (EPR)	6.50% per annum The EPR shall be paid to the IAH from, and subject to receipt of, profit payments under the Financing Facility after deduction of the *wakalah* fee (i) In the event the actual profit rate (APR) received under the financing facility after deduction of the *wakalah* fee is lower than the EPR, the APR shall be paid to the IAH (ii) In the event the APR received under the financing facility after deduction of the *wakalah* fee is higher than the EPR, the EPR shall be paid to the IAH and the excess profit will be retained by the bank as a *wakalah* incentive fee.
***Wakalah* fee**	0.50% per annum based on the outstanding total fund size.
Profit payment frequency	Quarterly.
Redemption/ withdrawal	Early redemption or withdrawal of investment prior to maturity is not allowed.
Reinvestment	Not allowed.
PIDM coverage	Not insured.

Source: Adapted from the IAP website

Successful ventures: An analysis

The cases referred to earlier illustrate the starters that have successfully pitched to and been taken up by investors on the IAP platform. It is apparent that all these ventures implement the risk-reward and return-based framework that matches

TABLE 16.4 Brief information on ICT Zone Venture

Description of the venture	**ICT Zone Ventures Bhd** The financing to the venture is in the form of working capital (term financing facility using *tawarruq*) of up to RM4.0 million (with an indicative profit rate of 6.08% per annum).
Sharī'ah contract	*Mudarabah muqayyadah* where the customer(s) (investment account holder[s] or IAH[s]) – the *rabb al-mal* provides capital to be managed by AFFIN Islamic Bank Bhd (Affin Islamic/ Sponsoring Bank) – the *mudarib*. The profit generated from the investment is shared between *rabb al-mal* and *mudarib* according to a mutually agreed profit-sharing ratio (PSR) whilst financial losses are borne by the *rabb al-mal* provided that such losses are not due to the *mudarib's* misconduct, negligence or breach of specified terms.
Type of investment account	**Restricted Investment Account-i Mudarabah** refers to a type of specific investment account where the IAH(s) (i.e. investor[s]) agree to a specific investment mandate for the Bank to invest and utilize the funds from this account in specific Sharī'ah-compliant business activities in accordance with its role as the *mudarib* i.e. financing the venture.
Parties involved in the investment	(i) **AFFIN Islamic** – the entrepreneur/*mudarib* (ii) **The IAH(s)** – the capital provider(s)/*rabb al-mal* (iii) **Fund** – AFFIN Islamic RIA-I, which is invested in a specific Bank's investment asset (iv) **Investment asset** – *Tawarruq* term-financing facility to ICT Zone Ventures Bhd.
Investment tenure	Two years.
Expected profit rate (EPR)	6.08% per annum on the outstanding Investment Account The EPR shall be paid to the IAH from, and subject to receipt of, profit payments under the financing facility based on the predetermined PSR.
Profit-sharing ratio (PSR)	80:20 (IAH[s]: Bank).
Profit payment frequency	Monthly.
Redemption/ withdrawal	Early redemption or pre-mature withdrawal is not allowed.
Reinvestment	Not allowed.
PIDM coverage	Not insured.

Source: Adapted from the IAP website

with the aspiration of the IAP establishment. While the contractual relationship between the sponsoring banks and investors are based on either restricted *mudārabah* or *wakālah bil istithmar*, the relationship between the sponsoring banks and the venture is governed mainly by sale-based contract, i.e. *murābahah* via *tawarruq* arrangement. As at December 2017, there is only one venture, namely

Project Ar Rahn, that utilises *mushārakah* as its underlying contract. In this arrangement, the subsidiary of Bank Muamalat Malaysia Berhad, Muamalat Venture Sdn Bhd (MVSB) sells down its share of capital contribution in selected branches under the existing *mushārakah* joint venture (which MVSB has ventured with the Permodalan Kelantan Berhad [PKB]) to the investors (i.e. IAH). MVSB, however, gives an undertaking to buy back IAH's share of MVSB's capital contribution at the end of the investment tenure at fair value which comprises principal and profit portions calculated as follows:

Principal portion	=	Amount of IAH's share of MVSB's capital contribution at par value
Profit/loss portion	=	Amount of IAH's share of MVSB's portion of actual profit generated/losses incurred by the selected branches during the investment tenure

The outcome of these projects is yet to be seen as they are still ongoing. Having said this, looking at the ability of these ventures to attract the desired investment amount from the investors which inevitably translates the appetite of investors, it warrants that these projects will be successful. The careful selection of ventures by the sponsoring banks through a robust and rigorous due-diligence exercise gives these ventures their successful ratings. Eventually, this could lead to a confidence boost among the investors and sponsoring banks as well as other stakeholders, particularly the cash-strapped but potential ventures. This, in turn, may prompt other Islamic banks to join the IAP as part of the sponsoring banks. In addition, other companies seeking investment funds for their projects may also turn towards this platform for their financing needs.

Nevertheless, there still remain areas that could be enhanced in the IAP for better development of the economy as a whole. It is observed that most of the projects financed through IAP thus far offer a fixed return. While the existing structures and/or arrangements are in compliance with Sharī'ah, offering alternative structures that are based on a non-fixed return is worthy of consideration. Such an option is in line with the true spirit of investment and will inevitably push the IAP towards a risk-sharing–based investment platform. The non-guarantee of these ventures by PIDM is an early positive sign of IAP going in this direction. It evidenced that the money placed by the IAHs are used for investment and not merely for bank deposits.

IAP and crowdfunding platforms: A comparison

The digital revolution has transformed the world of finance drastically during the past few years. Peer-to-peer (P2P) lending and crowdfunding, the notable outcome of the digital revolution, are becoming a new normal in the financing sector. These and other similar channels function as a bridge between the users and the funders. This new stratum has attracted interest from a different segment

of investors. The ability of these mechanics to raise funds in high volume within a short time-span have forced banks, both conventional and Islamic, to look into these alternative methods of intermediation. The emergence of the IAP evidenced the adaptability of Islamic banks in using digital revolution, fintech, crowdfunding and risk-sharing in their Islamic banking business. Through IAP, a safe and conducive marketplace is created that enables investors of different risk appetites to locate their matching entrepreneurs with diverse funding needs. The platform facilitates direct investment by investors in viable projects just like other fintech platforms such as P2P lending. IAP provides an innovative avenue for Islamic banks' customers to earn higher investment returns with competitive tax incentives.

In its broadest sense, crowdfunding consists of three distinct models of raising finance: donations or rewards-based crowdfunding; peer-to-peer lending; and investment crowdfunding. A range of different platforms operate in each space, and charities and social enterprises can also benefit from crowdfunding. From this perspective, IAP is most akin to the third type of crowdfunding, i.e. investment crowdfunding. This is because the fund providers under the IAP platform are motivated by profit-seeking. It is neither aimed as a donation, nor is there direct lending by peers/investors due to the involvement of Islamic bank as an intermediary between the investors and ventures/fund seekers. However, both crowdfunding and IAP share some features, just as the two are distinct from each other in certain ways. Some of these similarities and differences are explained next.

Nature and function of the intermediary

Both IAP and crowdfunding are similar in that the investors can participate in the funding of ventures or projects by making monetary contributions as an investment. However, the key difference between IAP and other technology-based fund-raising platforms lies in the intermediation roles played by the Islamic banks. The presence of these banks provides benefits, which may not be present in other platforms, like due diligence, performance monitoring, suitability assessment and investment management (Cheng and Lim, 2017). Moreover, participation of the Islamic banks creates a safe lending and borrowing ecosystem for both investors and entrepreneurs from corporations, cooperatives and SMEs (Mirzakulov, 2017), making IAP a more trustworthy avenue for different stakeholders, especially the investors.

Volume of fundraising

According to the European Commission (2014), crowdfunding is becoming more and more widespread, especially in the wake of the global financial crisis, as access to finance is getting more difficult and the lending capacity of the

TABLE 16.5 Volume of fundraising via IAP (as at December 2017)

Venture	*Amount raised (RM)*
CMC Group	12,000,000
ICT Zone	4,000,000
Kobimbing	6,000,000
SURIA	60,000,000
Perak Transit	10,000,000
Project Ar Rahn	20,000,000
Total	**112,000,000**

Source: IAP website

banks is reduced. It was reported that there were about 500,000 projects being financed through crowdfunding across Europe in 2012. According to Statista (2018), more than US$12 billion was invested in equity-based and reward-based crowdfunding projects worldwide in 2017. The volume of funds raised through crowdfunding, however, is incomparable to IAP. Within 2 years of its establishment, the IAP has been able to raise RM112 million (circa US$28 million) as depicted in Table 16.5.

The amount raised through IAP must be considered within the following context:

- IAP is only a local platform; hence, restricted to the Malaysian market/players;
- The platform was only launched in 2016; hence, will need time to develop;
- The platform is restricted to Islamic banks only, as the main reason for its launch is to promote risk-sharing and reward-based intermediation in Islamic banking business; hence, offering a platform to operationalise investment account as distinct from Islamic deposits pursuant to IFSA.

However, it is observed that the minimum threshold to invest in IAP could be seen as slightly steep to some investors. For example, the minimum investment amount is RM5,000 (US$1,250) for CMC Group, RM100,000 (US$25,000) for SURIA and RM10,000 (US$2,500) for other ventures. This is in contrast with some projects that have been funded by P2P platforms. For instance, Ethiscrowd – an Islamic crowdfunding platform – accepts investment as low as US$200 for some of its projects. Depending on their future income projection, it may be worthwhile for the IAP's sponsoring banks to consider reducing its minimum investment amount. By doing so, they would make the platform more accessible to retail investors as opposed to the current practice where it is only accessible to the affluent and high net worth investors (HNWIs). The reduction in the minimum investment amount will result in broadening the investor base which would make the IAP projects more affordable and easily funded.

Type of ventures

The launch of IAP provides a forum for investment account holders under the respective sponsoring banks to directly invest in ventures of established corporations as well as small companies or enterprises. The provision for these small companies or enterprises means the availability of the much-needed source of capital for the SMEs (Forbes Middle East, 2017). This initiative that strives to serve SMEs, a sector that has been mostly unserved and underserved by the existing financial system, would inevitably link the Islamic financial system with the real economy (Mirzakulov, 2017). Other fintech-based fundraising platforms have been serving SMEs as well as start-ups.

Appetite of investors

The projects that have been taken up on IAP evidenced a strong demand from investors in these ventures. All these projects have been subscribed within and before the expiry of the fundraising given period. In some cases, there has been oversubscription in projects. This gives a compelling signal that investors are interested and keen to invest in IAP. Nevertheless, the scope of IAP, which is limited to Malaysian investors, has restricted international investors from participating in the projects offered on IAP. Another important factor that would be able to drive and instil the motivation and appetite of IAP's potential investors would be the successful completion of the projects funded on IAP. If these projects are completed on time or the yields are proven to be better than the expected rate, this would propel the platform beyond its projection, and thus broaden its scope and appeal, like typical investment-based crowdfunding platforms.

Regulated versus non-regulated

The IAP model is quite similar to other online crowdfunding platform where projects are listed on the platform and their viability is screened by their registered members (Abdullah, 2017). However, the key factor that distinguishes IAP from other technology-based fundraising platforms lies in the intermediation roles that are played by the Islamic banks. This intermediation role makes the platform far more regulated than crowdfunding platforms due to close monitoring and due diligence performed by the Islamic banks involved (Cheng and Lim, 2017). In addition, BNM as the patron for IAP adds another layer of security, comfort and satisfaction for investors.

The inclusion of independent ratings has assisted investors to make an informed decision. This factor adds more security to the credit-worthiness of the ventures; hence, making the ventures on IAP more structured and organised. In short, the regulatory framework imposed on IAP and the different market players results in investment-making in the participating ventures safer, free from

some of the risks associated with crowdfunding platforms, as delineated in the next section.

Unique risks of crowdfunding

Like other fintech-based platforms, crowdfunding also faces certain challenges. The most striking issues affecting all existing crowdfunding models, as highlighted by the European Commission (2014) include the following:

- Advertising and advice by promoters or platforms that may be misleading;
- Treatment of payments: whether the contributions can be reclaimed or returned; and
- Risk of fraud (when the money collected is not used for their stated purposes).

In addition to these, the financial return or investment model of crowdfunding may entail further risks including:

- Legal uncertainty arising from the divergence of the local and extra-territorial laws;
- Financial risk, i.e. the risk of their investment being unprofitable or the risk of losing the invested capital due to project failure; and
- Lack of an exit option (liquidity risk).

Capital charge

It is noticed that most of the projects funded at IAP are based on an agency contract between the Islamic banks and the investors. Under this mechanism, the Islamic bank acts as an agent on behalf of the investors, and invests the funds collected. The bank charges a certain fee for its services and such a fee is approved by BNM (as at December 2017, the fee ranges between 0.2 per cent to 0.5 per cent per annum based on the total fund size). Additionally, the bank may also charge an incentive fee if the performance of the venture is better and the returns generated are higher than the EPR.

This practice, however, may not be the case with most, or all, of the crowdfunding models. The investment crowdfunding is usually based on an agency fee only, but with a higher rate than what is charged by Islamic banks under IAP. For instance, Ethiscrowd charges an agency fee of 5 per cent from the total amount raised from each fully funded project. Investors will receive returns as indicated on their contracts for all successful projects. If a project is fully funded but for some reason is cancelled, the funds of investors are returned and Ethiscrowd does not take its 5 per cent operating fee. If the profits generated from the venture are above the EPR, the investors receive this amount and not Ethiscrowd. This is different from IAP, where the excess profits are retained by Islamic banks as an incentive fee for their good performance in managing the funded projects.

Conclusion: Way forward

The IAP offers multi-fold value propositions and benefits. The IAP generates new economic strength through the promotion of entrepreneurship and job creation, which also promotes greater financial inclusion. Furthermore, the non-guaranteed nature of the IAP places less stress on the public to underwrite bank solvency and allows for savers to decide the amount of funds they would place in guaranteed and investment portfolios. It is hoped that in the long run this would enhance the prospect for more balanced growth, as opposed to cyclical bank lending cycles.

For Islamic banks, IAP creates a distinct asset class and a new source of income and funding. With a strategic collaboration between enabled institutions, it could become an effective channel for multiple types of funding, including grants and facilitate new growth industries such as biotechnology, green infrastructure, renewable energy, recycling technology, technology-based projects, e-commerce mobile applications, creative media and content development. Importantly this new investment channel may also promote *awqaf* (endowment) development.

The forthcoming plan to promote IAP as a multi-currency investment platform would propel IAP to become the first shared global platform for Islamic finance. This would provide a marketplace for local and international investors to invest in real economic activities and projects that are denominated in various currencies and financed by Islamic financial institutions from different jurisdictions (Aziz, 2016).

The recent introduction of BNM's Financial Technology Regulatory Sandbox Framework is another positive initiative in promoting the fintech sector. The aim of the regulatory sandbox is to enable experimentation of fintech solutions in a live, contained environment, subject to appropriate safeguards and regulatory requirements. This evidenced the openness of BNM towards innovation and its willingness to create or reform regulations for the promotion and growth of Fintech whilst maintaining financial stability (Bank Negara Malaysia, 2016).

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17

INTEGRATING *WAQF* CROWDFUNDING INTO THE BLOCKCHAIN

A modern approach for creating a *waqf* market

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Introduction

Looking at current global reports, it seems that half of the world's population is suffering economically and socially. According to the most recent estimates, in 2013, 10.7 per cent of the world's population (767 million people) lived on less than US$1.90 a day (World Bank|Poverty Overview 2018). Moreover, millions of people lack adequate shelter and access to portable water, health services and education and suffer from extreme hunger (Shah 2013). Muslim countries are not exceptional, even though many anti-poverty programmes have been implemented, yet the Islamic Development Bank reported that 351.2 million people are living on less than $1.25 a day (SESRIC – Statistical, Economic and Social Research and Training Centre for Islamic Countries 2015). Highlighting these upsetting statistics reveals the need to explore alternative ways to address some of the current global issues through the study of the role of the institution of *waqf* and the potentials of fintech.

Historically speaking the role of waqf covered almost all sectors such as health, education, agriculture, industry and the basic infrastructures without any cost to the state. During the Ottoman period, *waqf*'s role reached its peak not only in terms of giving charity but also in contributing to human civilisation. For example, *waqf* provided food for the poor; sheltered the homeless; enhanced health care and promoted education for the masses; encouraged commercial and business activities; provided jobs for young men; took care of animals; besides supporting various other sectors (Magda 2009).

However, towards the end of Ottoman Empire in the nineteenth century, the role of *waqf* deteriorated and diminished due to various social and political reasons. Hence, almost all *waqf* properties became idle, neglected, unproductive and were considered a burden on the government. Nevertheless, the recent call for the revival of both immovable and movable *waqf* shows an optimistic trend in

rejuvenating its role in Muslim-majority and Muslim-minority countries. Even though this revival call has not witnessed much success yet, the need for huge amount of funds is evident today for reviving and redeveloping the idle *waqf* properties in a modern way to benefit the masses, besides raising funds to assist and empower the poor and needy globally. This can be done through the adoption of new advances in fintech by integrating crowdfunding into the blockchain technology for the development of *waqf* properties. This will not only help in financing the development of *waqf* properties, but its ripple effects would be felt in addressing these global issues in a faster, more trusted and transparent manner.

Recent revival of the role of *waqf* in socio-economic development

Before discussing the need for the revival of the role of *waqf* properties, it is pertinent to briefly explain the nature of *waqf*, its classification and stipulations for the creation of *waqf*. *Waqf* is a financial charitable instrument established by withholding immovable or movable properties perpetually to spend its revenue on fulfilling various needs which is much needed today. In both cases of creating immovable or movable *waqf*, society at large will benefit through its immovable *waqf* buildings which are in the form of mosques, schools, hospitals, agriculture lands, besides the movable *waqf* which is in the form of money. The beauty of this institution is that it accommodates changes across different times and climes depending on the different societies' needs. For example, through its ten stipulations, which are actually five pairs (*ziyadah*/increase and *nuqsan*/decrease, *idkal*/addition and *ikhraj*/removal, *i'ta'*/granting and *hirman*/dispossession, *taghyir*/replacement and *tabdil*/conversion and *istibdal*/substitution and *ibdal*/exchange), the first three pairs allow for flexibility in changing the beneficiaries of the *waqf* while the last two pairs allow an actual change to be done for the unproductive *waqf*.

The recent call for the revival of *waqf* has motivated individuals, foundations, financial institutions and governments in different Muslim-majority and Muslim-minority countries to respond to such call. This revival has not only witnessed the revival of the role of *waqf*, but has provided a developmental approach in enhancing its role further to meet the crucial needs globally through linking it with the new era of fintech. The following section will present the current revival of *waqf* in both its forms – immovable and movable – to demonstrate the potential of *waqf* in order to integrate it with contemporary fintech innovations like crowdfunding and blockchain.

Current revival and the role of immovable waqf

With reference to immovable *waqf*, its revival comes in the form of financing the development of the old *waqf* properties, which have been left idle and unproductive for the past century, through using classical and innovative modes of finance (Abdel Mohsin 2014; Mohsin et al. 2016). Such a revival provides a

revolutionary reform in developing the old *waqf* properties and converting them into income-generating properties, and thus reviving the *waqf* role in different ways as explained later.

i. Providing shelter

Using classical and innovative modes of finance in Muslim-majority and Muslim-minority countries, it has been realised that the old *waqf* houses have been redeveloped and upgraded into modern residential areas and towers which will efficiently and effectively help in sheltering the masses. For example, in Malaysia, with a joint financing of a joint venture and build-operate-transfer (BOT) contractual arrangement, an old *waqf* land was redeveloped into 9 units of 3-storey shops and 76 units of 2-storey link houses known as Siti Aisah *Waqf* in Penang. In Sharjah, United Arab Emirates, using *istisna'a* (manufacturing or construction contract), a 12-storey residential building was constructed to assist the poor and the needy of Comoros Islands, a good case which shows the concept of transferability of *waqf* revenue from one country to another. In Iran, with a financing through build-lease-transfer (BLT), an old *waqf* property was redeveloped into 300 medium-cost unit apartments. Furthermore, in Singapore using *hikr* (long lease), a *waqf* property was redeveloped into residential area, known as Alias Villas *Waqf*.

ii. Enhancing business activities

There are also case studies relating to enhancing business activities through the redevelopment and upgrade of old *waqf* properties into modern commercial buildings. For example, in Indonesia using *hikr*, an old *waqf* market has been redeveloped into a commercial centre known as Kios Pasar Santa Blok M in South Jakarta. In Sudan, using *mushārakah mutanaqisah* (diminishing partnership), four idle *waqf* properties have been redeveloped into four commercial *waqf* buildings known as Harah Commercial Centre, Daud Hussain Tower, Burgu' Commercial Center and the Golden Tower. Similarly, using BOT mode of finance in Sudan and Kuwait, two idle *waqf* properties have been redeveloped into a commercial tower in Sudan and a shopping mall in Kuwait, respectively. In Singapore, with a financing through joint venture and *sukuk al-mushārakah*, an old mosque was reconstructed into a mosque and service apartment tower in Bencoolen road. In Bangladesh, financing through *mushārakah* (partnership) led to the redevelopment of an old mosque into a *waqf* complex known as Forhatunnisa *Waqf* Estate. The estate includes a mosque, Islamic schools and a commercial area that has shops, bookshops, hardware stores, a perfumery and a bakery.

iii. Enhancing the health sector

Using innovative modes of finance such as *mushārakah mutanaqisah* in Sudan, an old *waqf* house was upgraded and converted to a specialised hospital known as

Alzaytona Specialized Hospital, which is expected to treat sick people besides opening jobs for doctors, nurses and supporting staff.

iv. Supporting the education sector

In Malaysia using one of the ten stipulations which is *istibdal* (substitution), an old *waqf* school was converted into a college known as Al-Mashoor Maahad in Penang. Also in Malaysia, through the use of joint venture, an old *waqf* school was converted into a college known as Maahad Tahfiz Mithaful Ulum located in Klang. In Qatar, while utilising financing through long-lease finance, an old *waqf* school was converted into a women's centre for memorisation of the Qur'an. In Meknes, Morocco, through BOT finance, old *waqf* land was developed into a student hostel.

Creation of cash waqf *and its current role*

With reference to movable *waqf*, the revival came in the form of creating different kinds of cash *waqf* models (Magda 2009). Focusing on four cash *waqf* models – namely, direct cash *waqf* model, corporate *waqf* model, deposit cash *waqf* model and *waqf* share model – it has been realised that they act as fundraising schemes that finance different projects and hence demonstrate the modern role of *waqf* in meeting the current needs of the people as explained next.

i. Enhancing the health sector

Through creating the direct cash *waqf* model, corporate *waqf* model and deposit cash *waqf* model in Muslim-majority and Muslim-minority countries, cash *waqf* has played a significant role in enhancing the health sector in different ways. For example, in UAE, through the use of the direct cash *waqf* model, it succeeded in financing different healthcare programmes which are meant for the poor and needy. In Malaysia through the use of the corporate *waqf* model known as Waqf al-Nur, the operations' expenditures on hospitals and clinics were successfully financed. Similarly, in India and Turkey, the corporate *waqf* model was created through Hamdard Waqf and Sabanic Waqf, respectively. This model helped in financing the building of clinics, hospitals, laboratories, medical universities besides providing scholarships to students. In Bangladesh, through the deposit cash *waqf* model in Islamic banks, many villages were supported with good primary healthcare facilities and sanitation; supplying them with pure drinking water, establishing hospitals, clinics and healthcare, providing programmes specifically for the poor and providing health research grants for studies on particular diseases.

ii. Supporting the education sector

Similarly, through the use of the direct cash *waqf* model, corporate *waqf* model, *waqf* shares, and deposit cash *waqf* model, there has been significant support for the education sector in different ways. For example, in Singapore through the use of the

direct cash *waqf* model, many Islamic schools were successfully financed. In India the establishment of the corporate *waqf* model helped to finance building schools, libraries, universities, besides providing training programmes and granting scholarships, promoting research and publication. In Turkey, the corporate *waqf* model was used to finance the building of universities, providing scholarship, establishing recognition programmes for students, teachers, artists and athletes, besides financing the construction of sports facilities and financing the construction of housing and recreational facilities for teachers, and helping the poor and needy. In Malaysia, the corporate *waqf* model enabled financing educational programmes plus providing scholarships to the needy. Creating *waqf* shares in Malaysia helped in financing the construction of religious schools and an Islamic knowledge centre. In Bangladesh, the deposit cash *waqf* model, which was introduced in Islamic banks, helps to support the education of deserving students in the form of scholarships, and in supporting vocational education and education in specific areas, beside supporting specific Islamic schools/colleges, financing the cost of education of deserving descendants (*waqf ahli*), supporting projects in the area of education, research, religious and social services in the memory of the founder's father, mother and/or descendants.

iii. Alleviating poverty

The cash *waqf* models have also helped in poverty alleviation programmes. For example, in UAE through creating the direct cash *waqf* model, it managed to finance poverty alleviation programmes. In India, the establishment of corporate *waqf* model helped in promoting various charities and providing relief to the poor and needy. In Malaysia, the corporate *waqf* model was used in financing entrepreneurial development projects. In Bangladesh, the deposit cash *waqf* model in Islamic banks helps to improve the conditions of the hard-core poor, rehabilitation of the physically handicapped and disadvantaged, rehabilitation of beggars, rehabilitation of destitute women, uplifting urban slum dwellers, education of orphans, expansion and development of appropriate education for skills development and supporting informal education facilities for children. In Sudan, the *waqf* shares helped in supporting the poor and needy and providing them with education besides providing shelter for the orphans. In Indonesia, the *waqf* share model helped in supporting community development programmes such as poverty alleviation, provision of education and free medical services, besides financing entrepreneurial development programmes.

Supporting the orphans

The cash *waqf* models also helped in supporting the orphans. For example, in Singapore and the UAE through the direct cash *waqf* model, the much-needed aid was provided to Muslim orphans.

v. Supporting other charities

Through creating cash *waqf* models, other charities were supported. For example, in Singapore through the direct cash *waqf* model, it managed to finance

different types of charity projects. In India, such cash *waqf* was used in financing handicapped individuals and their dependents in terms of medical expenses, educational expenses, travelling expenses and living expenses. Moreover, it was also used to finance expenditures of deserving Muslim students in terms of distributing cash or useful items during Islamic festivals, distributing fruit and other edible items throughout the month of Ramadan (for *iftar* or breaking fast), distributing books and stationeries to poor school children, financing the cost of marriages of poor girls, including dowry and food, financing the medical expenses of poor Muslims, giving donations to orphanages and Islamic schools, giving financial aid to the poor every Friday, feeding at least ten poor people of any caste or religion daily, repairing and maintenance of mosques and Islamic schools all over India, taking care of the final rites of needy Muslims, giving monthly allowances to needy widows and poor women and financing their children's education, providing aid to schools, colleges and other educational institutions, and maintenance and support of the *mutawallis* (trustees of *waqf*) and their families in cases of unforeseen circumstances. In Malaysia, the corporate *waqf* model was used to finance human capital development projects and charitable projects. In Bangladesh the deposit cash *waqf* model in Islamic banks help in assisting different needs such as financing the marriages of poor girls, assisting deserving widows and supporting public utility services. Also, in Turkey, the *waqf* share scheme was meant to shelter the Syrian refugees and to educate their children.

vi. Sheltering the masses

Similarly, through the cash *waqf* models, projects involving sheltering the masses were successfully developed. For example, in UAE, this model was used to finance a ten-storey residential building, Al Khan District, Sharjah, UAE. Also, in Kuwait, through direct cash *waqf* model it managed to finance the development of old *waqf* house into residential towers, property No. 1596 and 1532 on Sharhabil Street.

vii. Renovating old mosques

The cash *waqf* models have also been used in financing the renovation of old mosques. For example, in UAE, through the direct cash *waqf* model, old mosques were successfully renovated. In Turkey, the corporate *waqf* model was used to finance the construction of mosques, while in Malaysia the same model was used to finance the maintenance and renovation of mosques. Similarly, in Malaysia the creation of *waqf* shares was used to build new mosques. In Bangladesh, the deposit cash *waqf* model in Islamic banks helped in the maintenance costs of mosques.

viii. Support burials of poor Muslims

In Singapore, through the use of the direct cash *waqf* model, the burials of poor Muslims were financed successfully. Similarly, in Bangladesh, through depositing cash *waqf* in Islamic banks, it helped in the maintenance of a graveyard.

The waqf *shares model and online donation*

There has been huge support for different schemes through online *waqf* donation based on the *waqf* shares model. For example, in Kuwait, *waqf* shares contributed directly in providing different *waqf* schemes and global humanitarian aids. Each scheme carries different mottos to motivate people to contribute. For example, Light on Earth Waqf Scheme carries the motto of "help the needy to live a better life", while the motto of Mosques Waqf Scheme is "a house in Paradise". Some of these mosques have schools, libraries, health clinics, orphanages, etc. that provide other social and health services in addition to religious activities. The Orphans Waqf Scheme has a motto of "be a caring parent". The revenue generated from investing in this *waqf* is spent on sponsoring orphans, building and maintaining orphanages, providing orphans with good education as well as a secure and caring environment so that they become active members in their communities. For Empowerment Waqf Scheme, its motto is "help the needy help themselves". The revenue generated from this scheme is channelled to financing productive projects, income generating activities, and for the construction of training centres. The Water Waqf Scheme's motto is "the best charity is to offer a drink of water". For this scheme, any amount is acceptable to finance the construction of dams, digging wells and supplying the poor with water coolers. The motto of the Needy Families Waqf Scheme is "provide education & health care". The revenue of this *waqf* is channelled into building schools and hospitals in addition to providing food and clothing for needy families (Magda 2009).

Similarly, in the United Kingdom, the creation of *waqf* shares through online donation plays an important role in assisting the poor and needy people in different countries. For example, Islamic Relief in the UK created different *waqf* share schemes through the Waqf Future Fund (WFF) for various long-term projects. For example, Education Waqf Scheme, Water and Sanitation Waqf Scheme, Orphans Waqf Scheme, Qurbani Waqf Scheme, Healthcare Waqf Scheme, Emergency and Relief Waqf Scheme, and Income Generation Waqf Scheme (Magda 2009).

The current practice of creating *waqf* shares in Muslim-majority as well as Muslim-minority countries provides successful cases in raising funds to meet the different needs of various communities. This needs to be further developed and promoted at national and international level as part of the overall Islamic finance innovation. Nevertheless, there are still some significant challenges facing such innovations which led to the call for the revival of *waqf* properties through different means of financing.

The continuous call for the revival of *waqf* through both approaches – the *waqf* share model and the online donation – succeeded in providing good examples for developing *waqf* properties and raising cash *waqf* for the benefit of the needy. However, it has been realised also that the development of idle *waqf* properties through the classical and the new innovative modes of finance only helped in redeveloping just 5 per cent of the total old *waqf* properties in the Muslim world,

leaving 95 per cent of old and idle *waqf* properties lying fallow due to lack of funds to develop them into sustainable money-generating properties (Magda 2009).

Moreover, with reference to the creation of cash *waqf* models which helped in raising funds that are most needed today, one would realise that such funds are still in small amounts compared to the increasing needs of people globally. In addition, some donors do not trust such schemes, since some of the schemes are not transparent in how the money realised is being channelled to the specified beneficiaries. So, this attitude has discouraged a lot of contributors to participate in such schemes. Therefore, one may have to look elsewhere to explore some other innovative platforms that are transparent, immutable, decentralised and generally immune to fraudulent practices. It is therefore important to ask whether blockchain technology and crowdfunding platforms could be used to raise the much-needed funds for the development of *waqf* properties. These two important components of the modern discourse on fintech, which have been extensively discussed in some of the previous chapters, require a closer look.

Potential of fintech in financing the development of idle *waqf* properties

Fintech comprises all applications of financial technologies and it has continued to evolve in the past decade to make financial services more efficient, faster, more transparent, cheaper and more human-centred. One cannot deny the role of fintech today since it is already attracting the attention of consumers and businesses everywhere, from a local merchant seeking a loan, the family planning for retirement, to the foreign worker sending money back home, among others. Moreover, fintech has a positive impact on society as it increases competition in the market place, reducing prices paid by customers and providing financial services to people whose needs are not being met by traditional banking. For the purpose of this chapter, the focus on fintech shall be on two important applications of fintech, namely: crowdfunding and blockchain technology. Generally, some pertinent questions that need to be answered here include: How can fintech help the development of *waqf*? How can Muslims benefit from crowdfunding platforms and blockchain technologies to develop *waqf* properties according to Sharī'ah principles based on Islamic law contracts?

Financing waqf development through crowdfunding

Crowdfunding has become an economic and cultural phenomenon over the last few years. On this platform, funding a start-up project will be done by raising small amounts of money from a large number of people through the Internet. The total global crowdfunding industry report of 2015 shows that the volume of fundraising has increased significantly from $2.7 billion in 2012, $6.1 billion in 2013, $16.2 billion in 2014 to $34 billion in 2015 (Crowdfunding Industry Statistics 2015, 2016). The success recorded by crowdfunding platforms has

opened great opportunities for individuals and small companies to raise funds for their businesses and start-ups through different platforms such as debt-based crowdfunding platforms, equity crowdfunding platforms and donation-based crowdfunding platforms.

Islamic crowdfunding is the structuring of the current financial technology of crowdfunding based on Islamic law contracts. A good example of Islamic crowdfunding was implemented by Ethis Crowd in raising money for investment projects. In this case, investors will agree to share the risk in investment either through *mushārakah* (joint venture partnership) or *mudārabah* (trust partnership) with zero interest in order to assist in building real-estate projects or any infrastructure project. Once the project is completed, the profit or loss will be shared depending on the Islamic contract used (Ethis Crowd 2018). The Ethis model has been discussed in Chapter 16 with a detailed analysis.

In a similar vein, there could be a *waqf* crowdfunding platform specifically designated for the development of *waqf* properties. In this case, investors will agree to share the risk in investment through any of the classical or the innovative modes of Islamic finance in order to assist in building any project on *waqf* land. Once the project is completed, the profit or loss will be shared depending on the underlying Sharī'ah contract. For example, this may be used for constructing a residential tower, shopping mall or commercial tower on idle *waqf* properties. In this case, investors will invest through *waqf* crowdfunding platform by any of the classical or innovative modes of Islamic finance such as *ijarah* (lease), *istisna'a* (manufacturing or construction contract), BLT, BOT, *ṣukūk al-mushārakah* (partnership investment certificates), *mushārakah mutanaqisah* (diminishing partnership), among others.

The following are potential *waqf* crowdfunding models that can be adopted to finance the development of idle *waqf* properties:

i. *Charity crowdfunding platform*. In this case, different kinds of charity platforms can be provided via the Internet whereby donors can select which charity platform they would like to donate to. For example, selecting a charity for scholarship, donors can donate money through the crowdfunding platform which will be directly channelled to the specified recipients. In this case, donors do not receive any pay-out or rewards from this platform but just seek rewards in the Hereafter. However, they will receive regular updates on their charity (Ethis Crowd 2018). In the same vein, this charity crowdfunding platform concept can be adopted by both direct and indirect *waqf* schemes mentioned earlier for redeveloping the idle *waqf* properties and for assisting those who are in crucial need.
ii. *Direct* waqf *crowdfunding for redeveloping idle* waqf *properties*. Similar to the above-mentioned cash *waqf* which was created in various schemes to redevelop the idle *waqf* properties, a direct *waqf* crowdfunding platform can be created to develop different idle *waqf* properties. For example, donors can select the project they would like to contribute to, like building a mosque,

a school or a hospital on *waqf* land. In this case, their contributions will be channelled through direct *waqf* crowdfunding platform where the money will be directly channelled to redevelop a project on a *waqf* land. It is important to note that since it is a direct *waqf*, whatever funds contributed will be directed through the *istibdal* (exchange) to redevelop a project on a *waqf* land. In this case, contributors will not receive any profit from these projects since it is a charity platform. Nevertheless, they can receive certificates to show their contributions in redeveloping such projects.

iii. *Indirect* waqf *crowdfunding for crucial needs*. Referring again to the earlier-mentioned cash *waqf* model which was utilised in various schemes in supporting those who are in need, an indirect *waqf* crowdfunding platform can be created to provide different projects online for contributors to choose from. For example, such projects may be aimed at feeding or empowering the poor. In this case, donors can channel their contributions through the indirect *waqf* crowdfunding platform where the accumulated funds will be invested and only the generated revenue from the investment will be channelled to any of those projects. Similarly, in this case contributors will not receive any profit, but they will receive regular updates on the impact of their charity.

Waqf on the blockchain

With reference to blockchain technology, which is a decentralised public ledger, it has been used for different applications, from security, shipping, to commercial transactions. For the purpose of this chapter, two unique applications have been identified: cryptocurrency as an alternative to fiat money and cryptocurrency for charity.

The first is the creation of cryptocurrency as an alternative to fiat money that offers hundreds of virtual currencies such as bitcoin, Ethereum and Ripple. These cryptocurrencies facilitate transactions in a transparent and honest way without a trusted authority or central server. Moreover, cryptocurrency makes it less demanding to transfer funds between two parties in a transaction. These transfers are enabled through the use of public and private keys for security purposes. These fund transfers are done with minimal processing fees, leaving users to avoid the outrageous fees charged by almost all banks and financial institutes for wire transfers.

The second one is the cryptocurrency for charity which has been developed more recently such as AidCoin and Charity Token. AidCoin is the token for charitable giving, built on Ethereum Blockchain and empowered by CharityStars. According to the AidCoin Whitepaper (AidCoin 2018). AidCoin is the ERC20 token that aims to become the preferred method to donate transparently through the Ethereum blockchain and to access the ecosystem of services provided by the AIDChain platform. The adoption of cryptocurrencies will impact the way people donate in the future and AidCoin is poised to play a leading role

in this new era of fundraising (AidCoin 2018). AIDChain is a platform that provides an ecosystem of services through an easy-to-use interface, connecting the non-profit community while allowing full transparency and traceability of donations. AIDChain's services include an internal exchange to convert major cryptocurrencies into AidCoin, a built-in wallet to store and donate easily, an explorer to track donations transparently, tools to connect donors with all the actors involved in the non-profit sector and templates of smart contracts to run fundraising campaigns (AidCoin 2018). It is also a payment gateway/embeddable widget that allows charities registered on the AIDChain platform to accept donations in different cryptocurrencies directly on their website, which are then instantly converted into AidCoin. This is to allow charities to simply manage all donations received within a single wallet while providing transparency and traceability through AidCoin (AidCoin 2018).

It is essential to highlight that there are no issues from a Sharī'ah perspective to adopt technology in the development of *waqf*. This is because the original rule in *fiqh al-mu'āmalāt* (Islamic commercial jurisprudence) is that a particular thing will be considered permissible unless its prohibition is proven. Therefore, since there is no objection to adopting technology in the development of *waqf*, it can be concluded that as long as the rules of *waqf* and other Sharī'ah conditions are considered in structuring a particular model, using technology to augment its role will not be an issue. It is recommended to do so as using technology will enhance the concept in a way that would allow for the revival of the declining *waqf* concept and also boost the confidence of the founders or donors who wish to participate in contributing to a good cause as per Qur'anic injunctions (see Qur'an 5:2).

Proposed *Waqf*Coin: Blockchain-enabled crowdfunding for *waqf*

It has been established that *waqf* is a concept that needs to be revived in this era to leverage on its numerous benefits in order to achieve its original value proposition. Technology would assist in achieving such an objective in a convenient, simple and fast manner. The most critical challenge facing the development of *waqf* at both domestic and global levels are the challenges in finding donors who will contribute to the development of the projects. From the donors' perspective, the main concern is to find reliable trustees who will channel the donors' contributions as per their instructions and provide regular progress reports on the projects undertaken using their contribution.

There is an invisible chain of perpetual trust that must be continued by the trustees of *waqf* the moment the money is contributed towards a project which must not be broken due to lack of communication, misconduct, negligence or fraud. The moment this chain of trust is broken, a motivated contributor's trust to assist via *waqf* is lost and slowly the number of contributors will decline and become extinct. This explains why the number of *waqf* contributors continues to

decline. This might sound too simplistic, but if one looks at the bigger picture, it is clearly evident that it is the lack of transparency that led to the lack of confidence in *waqf*. Therefore, *waqf* can be revived and boosted through a proper governance framework and a system that is inherently trustworthy.

Currently, there is increasing demand for *waqf* but there are limited contributors in the market, making it impossible to turn *waqf* into a global phenomenon to aid humanity and uplift the socio-economic condition of nations in need. Linking crowdfunding and blockchain to *waqf* could help to resolve this issue and it is important to create a proper product for this. This chapter therefore proposes a product to be known as *Waqf*Coin to achieve the objective of maximising the benefits of *waqf* in the socio-economic transformation of modern communities.

*Waqf*Coin will be the modern name for the *waqf* market product which can be issued by any company interested in collecting and pooling financial resources for a good cause which is charitable in nature. There will be two stages of *Waqf*Coin offering; the primary market level and the secondary market level. Just as shares and *ṣukūk* are the products found in the capital market, the *waqf* market will have *Waqf*Coin, which will be available to potential contributors as tokenised securities. As such, the creation of *Waqf*Coin will be the first step towards the establishment of a *waqf* market and once a *waqf* market is created, a full-fledged ecosystem for *waqf* will be developed. At a global level, indicators to measure the success of *Waqf*Coin will be developed and monitored. It is pertinent to note that this *Waqf*Coin only resembles a coin that is linked to a scheme; it is not a cryptocurrency.

*Waqf*Coin can be defined as a dematerialised coin which indicates the number of units owned as contribution towards a *waqf* project offered by a specific company listed in the *waqf* market for the objective of offering *Waqf*Coin to the public. The contributors will contribute money without expecting a monetary return, but they will expect to know the socio-economic impact of their contributions in the form of a socio-economic return statement issued to them perpetually or throughout the lifespan of the project. This socio-economic return statement will help the contributor to understand how much in monetary value his/her contribution has uplifted the poverty or the success level of the project. The measurement tools and methodologies, including the formula for this need, are supposed to be issued by a regulatory authority that is in charge of regulating *Waqf*Coin.

There must be a regulatory authority that monitors the *Waqf*Coin offerings at the primary and secondary market as well. The proposed regulatory authority should be the regulator for capital markets in a particular jurisdiction. In the primary market offering, a company interested in issuing the *Waqf*Coin to the public must submit to the capital market regulator a proposal stating the purpose and the projects they want to raise contributions for. After doing due diligence of the company and the projects proposed, the capital market regulator will give consent to offer *Waqf*Coin to the public, whereby the company will have to

issue an initial *Waqf*Coin offering a prospectus to the public for a defined period of time and then the public can subscribe to it. This could follow the standard process of initial coin offering (ICO). After the initial offering of *Waqf*Coin is closed, and within six months, the company that offered the *Waqf*Coin must begin the implementation of the project as per the prospectus and must provide regular updates to the regulatory authority which shall conduct an audit of their claims. Once the audit conducted by the regulatory authority is finished, and if the company has conducted its activities as per the prospectus issued, then the company will have to issue a statement disclosing to the *Waqf*Coin holders that the project has successfully started.

The company will be listed successfully in the secondary *waqf* market. However, if the regulatory authority finds that the company did not use the contributors' funds as per the prospectus, then it will blacklist the company and appoint an external auditor and a trustee to return the funds to the contributors immediately. If the funds are not readily available, then the matter will be the subject of litigation in a competent court and a compulsory liquidation proceeding of the company will commence. In addition, the corporate veil of the company may also be lifted in order to hold the directors of the company individually liable for the breach of trust. This is to ensure that the trust of contributors is perpetually upheld.

In the secondary market, two types of activities will be monitored. If the *Waqf*Coin is transferred to an heir, this process will take place as per the guidelines issued and the maintenance of the main register of contributors will be done. Also, the successful implementation of the project and its stages in real time will be monitored and revealed in a timely manner in the secondary market. The main purpose of the secondary market is to help the monitoring of the performance of *Waqf*Coin until the project ends in a transparent manner.

When *Waqf*Coin is issued to the public by a company, the Sharī'ah underlying structure underpinning the contractual relationship between the company and the contributor or *Waqf*Coin holder is *wakālah* or agency contract. The principal will be the *Waqf*Coin holder and the agent will be the company. For checks-and-balances purposes, intermediaries will be involved in the transaction whereby an independent trustee is appointed to verify that the operation can be made, and a project rating confirmation by a rating agency could be issued to ensure that the project has adequately dealt with all the risk factors. It is important to reveal to the public the risk factors involved in the project and the risk mitigation tools used to comprehend whether their donations will create an impact and improve the livelihood socially and economically for the needy. Since all transactions, including the ICO and the disbursement of funds for the project are expected to be recorded on the blockchain, it will be easy to monitor and assess whether the beneficiaries have received the trust's money. The process is expected to be seamless due to the use of blockchain technology.

Since *Waqf*Coin is the general term used to represent the token to be issued to prospective contributors, the coin when used in *waqf* market must be linked to the project or company name offering it. For example, if ABC company is

offering the *Waqf*Coin, the *Waqf*Coin offered by the company would be known as ABC *Waqf*Coin. Therefore, the generic term will ensure that a proper ecosystem is built to deal with *waqf* in a manner that not only the technology upholds its integrity, but the governance mechanisms that are put in place will ensure it is hard, or impossible, to commit fraud in the name of *waqf* or charitable causes. The types of projects to which *Waqf*Coin can be issued are in general any kind of project that will socially or economically assist a needy community to enhance their standard of living.

Conclusion

The last few decades witnessed the revival of waqf through two approaches: redevelopment of the old and idle *waqf* properties and the creation of cash *waqf*. Even though this revival shows an optimistic approach in stimulating the role of *waqf* in Muslim-majority and Muslim-minority countries, it is believed that in this era of technology there is scope to enhance the role of *waqf* by integrating crowdfunding and blockchain technology to *waqf*.

*Waqf*Coin has the potential globally to create a *waqf* market that will emphasise the necessity of *waqf* for serving humanity. It is not only the culture of saving that needs to be promoted among humans, but the culture of giving to others also needs to be promoted. *Waqf*Coin will assist in creating an economically balanced human being. A balanced human being will not only save and invest, but will also give to others. *Waqf*Coin, using modern technology, which integrates crowdfunding and blockchain, will promote charitable endowment. Through *Waqf*Coin, anyone giving small or big amount can feel the satisfaction of giving to others. It is the right moment to initiate *Waqf*Coin and launch *waqf* market, as today the need for *waqf* is huge. In order to serve humanity through the financing of *waqf* properties, there is a need for regulators and start-ups to consider this *Waqf*Coin proposal.

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18

BLOCKDENTITY

A future beyond digital identity

Ishaq Mustapha Akinlaso, Ibrahim Opeyemi Adediran, Abdoulaye Kindy Diallo and Ziyaad Mahomed

Introduction

The last trillion-dollar industry was built on a code of 1s and 0s and the next will be built on genetic codes. Well, who knows? It's no longer unthinkable. Traditional economics had maintained that factors of production comprised of land, labour and capital. While that may still be true, it is only valid in certains ways, today; just as was the case once upon a time, when land was the raw material for the agricultural age. It only lasted for a period before the inevitable change, and iron became the new raw material for the next age – the industrial age. Today, we live in the information age, where technology has taken charge and data is its raw material. More specifically, identity data is the focal point of data structures and dimensions. This is well corroborated in one of the opening statements of the recently implemented General Data Protection Regulation (GDPR).[1] As emphasised by Voigt and Von dem Bussche (2017), "(t)he processing of personal data should be designed to serve mankind".

The world that we live in today, and the way that we conduct business transactions, has changed incredibly from the past decades, and all thanks to a deep-reaching digital transformation ushered in by the information age. This transformation has proliferated into all human interactions and is feeding a demand for innovation and advancement, while introducing a new form of identity – digital identity – and challenging the traditional ways of day-to-day transaction.

As illustrated in Figure 18.1, man's identity is tied to the age and it evolves with new technological possibilities. Over time, recording identity information has transformed tremendously, from the era of stones, wood and spears to paper and documents, which are all in physical form, to digital forms in this age of information and big data. What lies beyond remains unknown, but the current

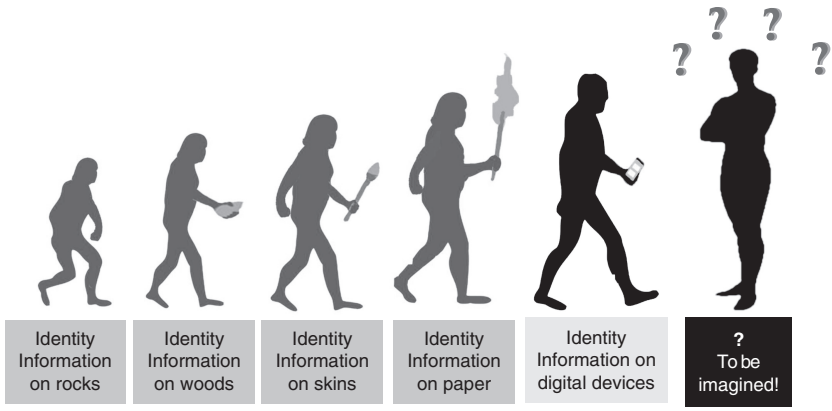

FIGURE 18.1 Evolution of human identity.

trend suggests a close link with the technological possibilities of the future, perhaps as far as man's imagination can conceive.

This chapter reviews the concept of identity, the challenges of traditional identity systems in financial transactions and demonstrates the role of digital technology in redefining identity systems in the future. The chapter finally presents an innovative concept for digital identity-management that is powered by blockchain technology – "Blockdentity". Blockdentity is a digital identity management and Know Your Customer (KYC) concept that implements Service Set Identifier (SSID) protocol using blockchain technology to provide adequate identity sovereignty to users.

Identity, humanity and technology

Identity is central to all human activities. Humans need a mechanism to recognise one another and to identify themselves to their counterparties and larger communities. Arguably, for that reason, humans often maintain multiple identities and shifting between a variety of them in different contexts (jobs, online, family, friends, etc.) is an indispensable part of everyday life. The human identity ranges from physical form, psychological, social to legal and now includes digital identity forms (Bostrom and Sandberg 2011). While this point may be obvious, the proper functioning of these human identities are essential for wellbeing, and accordingly, threats to it often evoke strong reactions.

From the various human identity forms, legal identity is without doubt the most essential for the functioning of modern societies. Similarly, digital identity is becoming increasingly important. Digital identity is a set of electronically captured and stored attributes and credentials that can uniquely identify a person (Clark et al. 2016). Digital identities are based on digital technology that serve to provide access to different resources (both online and offline) and also to help individuals link different identities together seamlessly. With the aid of

digital identity, many people today maintain a variety of distinct user accounts and online personas with which they are able to access a range of services. For example, an individual might have a physical bank account, a PayPal account, a couple of email addresses, a Facebook or Google+ account, an iTunes account, an eBay account and subscriptions to several online services, such as Netflix. In most cases, many of these identities are interlinked.

An email address may be used as a username or password for different online services and the PayPal account will be linked to the bank account. Combined with Facebook, they might all be connected to an eBay profile, showing the transaction history of the user and the reputation she has acquired as a buyer or seller. The Facebook and/or LinkedIn account might serve to tie together the several communities that such a person is a member, reflecting various aspects of his or her life – hobbies, sports, friends, family and work.

Consequently, digital technology can affect how our identities function and, as a result, it plays an important role in shaping the style, the efficiency and the impact of our transactions as a society. This means that now more than ever, the ability to manipulate those codes of 1s and 0s will be a major determinant of our positions and roles in the global production landscape in the foreseeable future.

Identity systems and Islamic financial transactions

Identity is constitutive to trust, and trust, alongside fairness, is foundational to any transaction that is sanctioned by Islamic law.[2] As such, the process of identification is a necessary condition for a proper transaction to hold. As illustrated in Figure 18.2, identity-related questions are foremost in the minds of transacting parties, in order to establish trust. And trust is crucial to developing a meaningful relationship for repeated transactions, or to tailor the delivery of products and services in the Islamic financial services industry and the global market economy at large. In effect, identity systems have emerged to allow entities to substantiate information about their counterparties and to develop trust and confidence while interacting with one another.

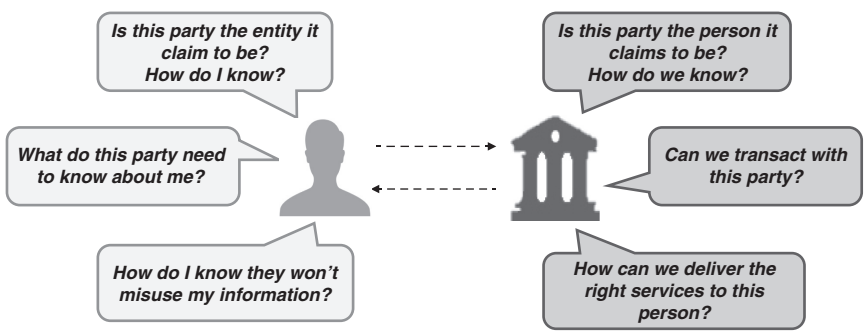

FIGURE 18.2 Trust, identity and transaction.

In small and close-knit societies, simple mechanisms such as familiarity, appearance and, perhaps, vouching by an elder or any revered individual are sufficient. However, in the rather complex and more sophisticated economies of today, more formal structures are required. Hence, the contemporary world has relied on physical identity systems in all transactions, and has done so for ages. These physical identity systems are largely paper-based, nationally driven and government-owned systems. They are usually presented in the form of identification (ID) cards that include the signatures or representations of their holders, and are verified against documents stored in a central registry, which is centrally planned and managed.

In the Islamic financial services industry, just like in its conventional counterparts, identity is central to enabling the delivery of basic financial products and services. Islamic financial institutions (IFIs) need it to comply with regulations, assess risk and credit and to provide a tailored customer experience. For such purposes, detailed and accurate identification is critical. As standard practice, for instance, individuals seeking certain Islamic financial products or services can only be offered such services after the well-known and widely accepted identity protocol KYC[3] has been conducted. This, in effect, is to ensure that the customer is duly identified and fulfils the eligibility conditions for such a service.

However, the legacy identity systems have not all been efficient and cost effective, against the growing demand for Islamic financial services and global financial services in general. In fact, the current systems are considered to be inadequate in the face of increasing customer satisfaction standards and against the growing criminal sophistication of fraud schemes. This limits the ability of Islamic financial institutions to provide a seamless and secure transaction experience to their customers, thus impacting on their competitiveness. This limitation is more profound for Islamic financial institutions in a dual banking setting, where the conventional counterparts are usually quicker and better at adopting new technologies in their operations. In essence, the need for a better digital system cannot be overemphasised in the Islamic financial services industry. The adoption of a digital identity system is both timely and necessary to enable the transition of global Islamic finance into the digital economy, which is the new normal of the information age.

Challenges of legacy identity systems in Islamic finance

Recognising the importance of digital technology as a key enabler in the new digital economy, a growing number of IFIs in emerging market jurisdictions are moving beyond the reliance on physical identity protocols and are transitioning to the digital identity modes in the delivery of basic financial products and services. Also, there are efforts by governments in this jurisdiction to support the transition from legacy identity systems to the digital identity modes for transactions. A noteworthy example in this regard is Malaysia, who has recently announced its plan to officially introduce a digital identity system with a view

to boosting the e-commerce sector and fighting cybercrime at the same time (Malaymail 2018).[4]

However, in some jurisdictions where IFIs operate, the majority of customers still seem to prefer the brick-and-mortar structure to any other channels (Finacle 2012). Arguably, this is on account of the internet service penetration and technology adoption in these markets.

Nevertheless, the transition to digital identity systems is especially crucial in this era of information prevalence. The innovation space for financial products and services is seen to be fast saturated with many new offerings that are often not very distinct from one another in terms of economic substance. This, in turn, places the IFIs in close-knit competition not just among themselves, but also with their conventional counterparts, to innovate in the delivery of products and services in order to win the confidence of customers. Under such circumstances, it takes the slightest bit of advantage in the quality of service delivery, which begins with the identification process, to gain the upper hand in such healthy competition.

All things being equal, customers will always appreciate qualities of speed, coverage, convenience and security in financial service delivery. In this era of declining information asymmetry and competitive price discovery, IFIs whose service delivery exhibits these qualities are more likely to edge out rivals in winning and retaining customers in the same market.

Take, for a simple example, the process of onboarding a new client for an Islamic finance service (for instance, a Mudarabah Investment Account), which is without doubt crucial to winning business, servicing relationships, realising revenue and fulfilling compliance regulation. During this process, clients are required to provide series of information pertaining to their identity and worth. The client's information is then subjected to several scrutinies and approvals (usually simultaneously and sequentially) from a range of other business functions such as credit, legal, governance and compliance and operations. The manual and physical mode of executing this entire process translates to a lack of visibility, automation and cross-verification over the entire process. This subjects the client onboarding application to infinite delays.

Under traditional identity systems, customers can become frustrated if they are asked to provide identity information multiple times at every step of the process. Furthermore, a poorly managed verification set-up can affect customer perception and relationships. At the slightest chance, clients would opt for the most convenient and secure alternative.

Generally, identification processes have been deeply enhanced with digital technology. However, the underlying structure and systems that have fuelled inefficiency and error in the identification system remained the same despite the technological progress. In effect, the underlying structure of the existing identity system still impacts on the quality of financial service delivery and, in turn, revenue. But before proceeding to discuss the pertinent issues with regard to the legacy identity systems, it is important to demonstrate the underlying structure of the system.

Legacy identity system and its potential application in Islamic finance

The purpose of an ideal identity system is to allow counterparties to engage in trusted transactions without a previously established relationship. A typical identity system is based on a tripartite structure. The three parties in the identity transaction includes; an identity owner (party claiming to be who he or she is – CP)[5], an identity relying party (counterparty to whom the identity claim is presented – RP)[6] and third-party identity verifier or third party (a trusted authority who attests identity claims).

In the identity system, attributes of the identity claiming party (CP) are attested to by the trusted third party who issues some credentials that tie their attestation to the specific attributes verified. In the traditional communal setting, an individual seeking to identify himself to another party would rely on the attestation of a mutually trusted third party (community leader, or older person) whose authority and reverence is generally acceptable. The digital setting works in similar fashion, but with some improved modifications. For instance, the third party (though remaining trusted), presents the attestation credentials with a level of authentication that assures the identity relying party (RP) of its validity and originality.

In the identification process illustrated in Figure 18.2, CP presents one or more identity attributes for a claim ("My name is Hisham Hanif" or "I was born on 1 January 1975") to the trusted third party. The third party verifies the claims and issues an attestation credential which is to be presented to the counterparty, the RP, in order to conclude the identification process that is required for their transaction.

Figure 18.3 provides a detailed illustration of the identification process typical in IFIs and its customer seeking a financial service such as opening a bank account.

In Figure 18.3, Mr Hisham – Identity Claiming party (CP) – is a potential customer who wants to open an investment account in an Islamic bank – Bank Adini (Identity relying party – RP). He is a Nigerian person (claim) but he needs proof of that to enable Bank Adini to accept his claim, identify him and onboard him as a new customer. Hence, he presents a Nigerian passport (the proof), which is an attestation from the Nigerian government of his citizenship. The transacting counterparty (Bank Adini or RP) considers the proof presented and accepts the claim of the customer after a vetting process. Hence the identification process is completed and the customer is now ready to be onboarded for the desired financial service.

The illustration above represents a simple-world scenario where trust is eminent and the need for speed, convenience and security are all held constant. In the more complex set-up, the Bank Adini (Relying Party – RP) would require more identity documents or attestation and in some cases additional authentication on the attestation provided by the trusted third party as a genuine proof

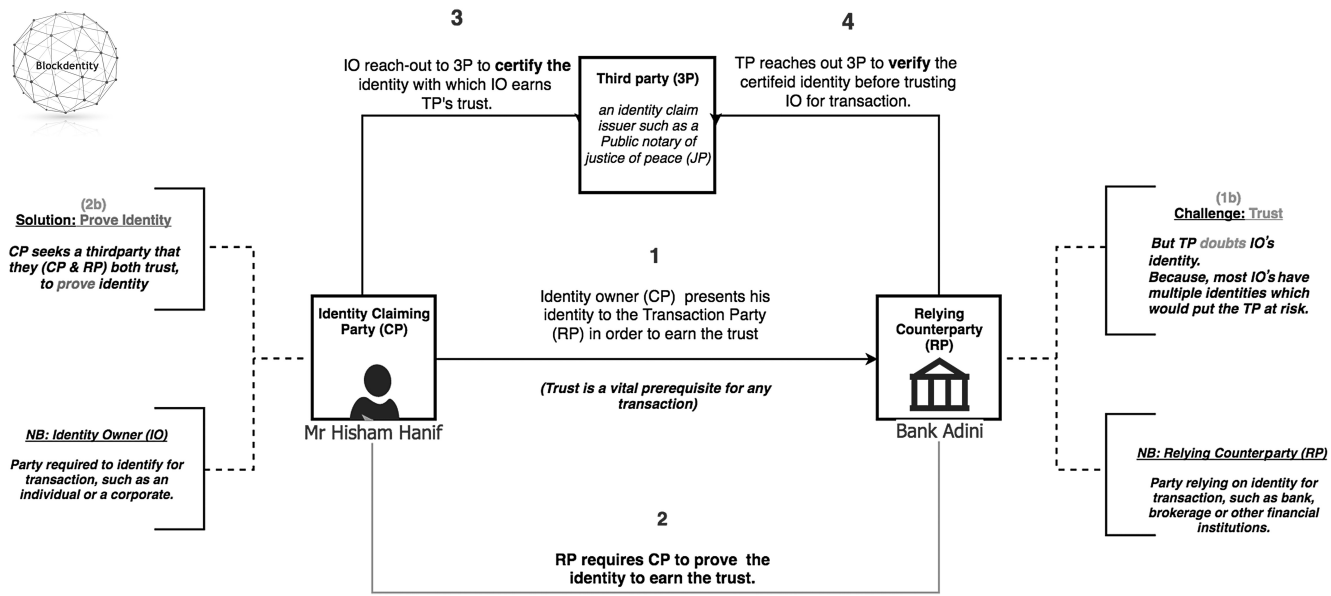

FIGURE 18.3 Traditional identity system.

from them. This, in effect, delays the identification process, introduces new cost and removes the convenience in service delivery.

Hardly surprising, between the simple-world and the complex-world scenarios, the complex world scenario is more in tune with the reality of the financial industry today. It depicts an era where fraud is pervasive and costly to financial institutions. Furthermore, IFIs, in the face of competition as a tranche of the global financial market, are by regulatory obligation or risk management practice compelled to verify identity claims thoroughly and effectively before onboarding a new customer. By implication, the process is to be repeated at every instance of a new product subscription to the same counterparty or similar product from a different counterparty (say Adini Insurance).

In brief, the more realistic scenario underscores the inadequacy of the legacy identity system to function in the complex modern-day transaction set-up and, on the other hand, highlights the need for a sustainable alternative.

Challenges of legacy identity systems and how it matters in Islamic finance practice

It is quite settled that the digital identity process is positioned to help overcome many limitations of the traditional identity system that is based on tedious physical documentation processes. This notion is well placed by the World Economic Forum:

> Current identity systems are limiting Fintech innovation as well as secure and efficient service delivery in Financial Services and society more broadly. Digital identity is widely recognised as the next step in identity systems.
>
> *(World Economic Forum 2016)*

Consequently, like their conventional counterparts, IFIs are fast adopting the digital process in their operation, thus allowing for smooth, convenient and, overall, an improved quality of financial service delivery.

However, there remain some structural challenges in the identification process if the financial services and the general services sectors are to maximise the scalable potential afforded by the digital era. For instance, there are limitations in the ownership, security, access and interoperability of identity data in the current identity system. This makes it difficult to efficiently maximise identity information and utilise it across services from different institutions. These structural challenges in turn hamper the flow-transaction engagement between business enterprises, the growth potential of IFIs and the macro-economy at large.

As the digital identity space continues to evolve and more innovative solutions are developed, the fundamental weaknesses become less visible but more impactful. They form a significant drawback in implementation of identity solutions and the successful development of the next generation identity system. These

structural weaknesses have spurred some concerns over the usage, ownership, access, protection, privacy, security, interoperability and linked data portability of identity information to identity owners and the relying counterparties.

New challenge: Centralised data structure in digital IDs

Today, a growing variety of digital identity concepts exist to replace the old-fashioned paper-driven process and fulfil the need in the services industry. Most of the digital identity concepts in operation still maintain large centralised databases that shelter millions of identity records. However, this development came with a fundamental weakness that has a significant impact on lives and the economy. On the one hand, due to the size and structures upon which the digital identity concept is built, they are both attractive and vulnerable targets for felonious entities (malicious hackers). And on the other hand, for risk management concerns, the structures designed became restrictive to accommodate the progressive need for interaction, access and ownership of identity information.

Addressing these fundamental weaknesses rather than accepting them as a norm is certainly the way forward if we are to remain progressive in the adoption of digital technology for human good. By so doing, the weaknesses are not to be accepted as fundamental any longer, but are to be regarded as time-bound structural challenges to be swamped by far-reaching innovation. Such innovations are initiated from the structural core of the identity systems – Inside-Out Innovations. These challenges are discussed in what follows.

Cybersecurity and data breaches

The vulnerability of centralised digital identity databases grows as the size becomes larger, which implies a serious concern for security and scale. A single, large, centralised database implies a single point of failure, which is opposed to the segmented, decentralised multiple databases. This is logical because the reward for a successful breach is increased exponentially with the amount of identity information held in the centralised database. The past decade has witnessed the largest data breaches in different spheres of business. As shown in Figure 18.4, these breaches, put together, highlight the vulnerability of centralised databases.

First, there was the Heartland Payment Systems data breach in 2008, which exposed the credit- and debit-card information of about 130 million people (Bank Info Security 2009). Then there was the Anthem Blue breach, exposing the personal health records of 78.8 million individuals in 2015 and, about a year later, the Equifax Social Security data breach blew out, compromising the personal data of up to 145.5 million individuals in 2016 (CSR 2017; Reuters 2017a). As though a never-ending trend, the Sonic Drive-In breach exposed the credit-card details of approximately 5 million individuals (NAFCU 2017; SecurityWeek 2017). The latest is the Facebook breach of its users' personal

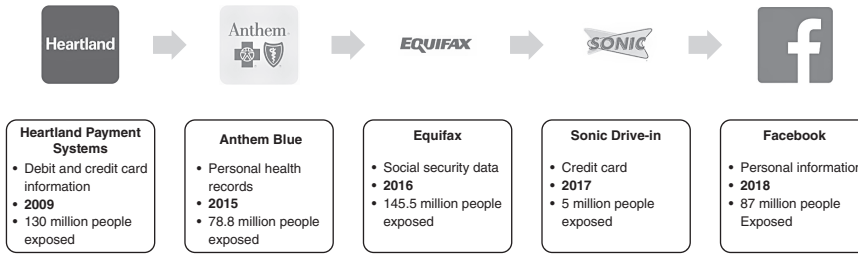

FIGURE 18.4 Largest data-breach cases 2008–2018.

information in 2018, exposing about 87 million people (BBC 2018; Issie 2018; The Guardian 2018). All these, put together, call into question the continued practice of collecting large sets of highly sensitive data in centralised structures.

In some other instances, the citizens of entire countries (such as Sweden) have suffered potentially devastating personal data breaches (Reuters 2017b). These breaches often do not occur as a result of hacking or other malicious efforts but, instead, because appropriate safeguards did not exist to prevent unauthorised access to the data. Furthermore, individual identity documents are valuable commodities that are easily sold on the black market (dark web), where the purchasers of stolen identity data can use this information to commit fraud and other crimes using the names of the innocent identity owners. Also, beyond the obvious damage to the identity owner, such breaches create significant liabilities for the business enterprises who are the operators of the databases.

Restrictive structural access

This is another significant challenge that impedes the use, ownership and interaction with identity information. In an effort to prevent unauthorised access, most centralised databases are built in a defined single and restrictive data structure by the operators (Ambrose 2016). Effectively, this prevents the identity owners (customers) from gaining access to their own data. In such circumstances, personal data cannot be linked to the benefit of the identity owner. Yet, linked data is a key component of digital identity acceleration, as linking data means that the identity owner can create linked relationships between data to their benefit, which is not a technically difficult task.

As a matter of fact, linked data technologies like URIs (a way to identify entities), LEI (legal entity identifier) and HTTP (a simple but universal mechanism for retrieving resources) have been around for years and are widely available today. Yet individual identity owners cannot benefit from linked data, all on account of the inherited structure of identity systems. Most IFIs are not different from the conventional counterpart in this regard. Their database system is pretty much centralised for security concerns, but extremely restrictive for no reason.

Looking beyond the technical limitations and security risks introduced through using a centralised database, there are a number of business concerns that are ignored and opportunities that are forgone.

Therefore, a paradigm shift in the structure of existing identity systems is now imminent. A new identity system wherein identity owners have the control of their identity records, which they can use to complete several transactions, is much needed. This would allow for proof of identity to be communicated between entities in a standardised digital format. Identity information can continuously adapt to new requirements through the integration of additional information. The development of a secure structure that also allows individuals to retain ownership of their identity and interact with it as described is tantamount to developing a sustainable digital identity model for our evolving global society.

Blockdentity: An innovative solution redefining the next generation's digital identity

Blockdentity is a decentralised digital identity-management system powered by blockchain technology. It reflects on the inherent problems of centralised and obscure database structures to present a secure, decentralised and sovereign identity-management solution. A blockchain is a growing list of records, called blocks, which are linked using cryptography (Narayanan et al. 2016). It is an open (yet resistant to modification), distributed ledger that can record transactions between two parties efficiently and in a verifiable and permanent way (Marco and Lakhani 2017).

Leveraging on blockchain technology with integration technologies, the Blockdentity framework enables individuals and entities to securely store identity information, instantaneously seek verification for their identity, and use it to access a variety of services within the platform. It is set to be a secure Omnichannelled identity platform that runs on blockchain technology to allow users store their identity information and apply it to securing a number of services ranging from financial, to healthcare, government administration, education and legal services.

Blockdentity solution stems from the basic idea of a Self-Sovereign Identity (SSID), where people and businesses can store their identity data on their own devices, and provide it for third-party validation effortlessly and efficiently and without the need to rely on a central repository of identity data. It is beyond a digital way of doing what we do today with bits of paper and ink signatures, as it empowers the identity owner to be at the core of their identity-management process.

The Blockdentity concept presents a case that enables the users to get by the hurdles and challenges inherent in both the traditional paper-based documentation and digital but centralised identity systems with privacy control, security, transparency and individual rights (see Figure 18.5).

As depicted in Figure 18.4, the Blockdentity concept presents enormous value proposition for identity management. With the immutability and transparency

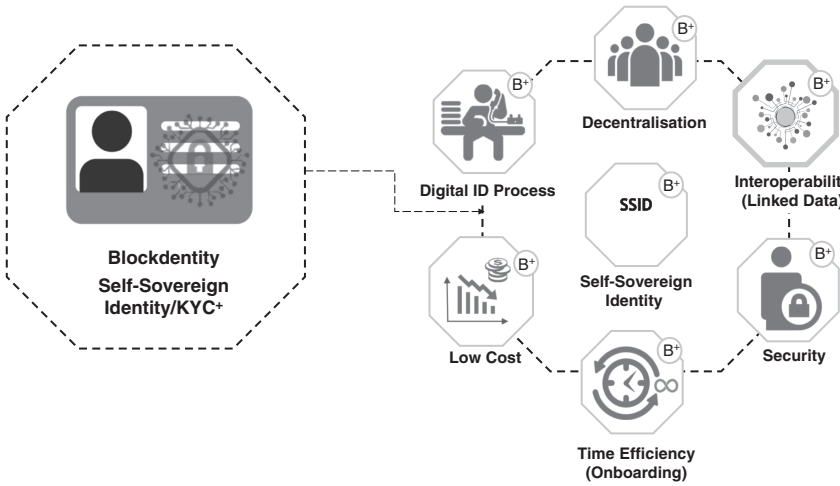

FIGURE 18.5 Blockdentity snapshot.

of a database powered by blockchain technology and the advent of reliable integration technologies, the development of a sustainable digital identity system for our evolving global society can no longer be hard to imagine. It is in fact a near-concrete reality, where identity exists as a set of digital records that an individual can control and use to complete transaction of any kind. Proof of identity can be communicated between entities in a standardised digital format with advanced features that can adapt to the nature of any transaction and continuously adapt to regulatory requirements by integrating additional information. The key words here are digital-based, interconnectivity, flexibility and security. The integration of these words in reality promises security, seamless share ability and accurate use of identity information.

Blockdentity: Practical application (user perspective)

Blockdentity is developed with several individual components, including the blockchain, which is a fundamental technology to the new digital identity concept. However, blockchain itself is not the solution to challenges of existing digital identity concepts. Blockdentity implements the SSID protocol using blockchain technology. A self-sovereign identity is "owned" by an individual, which implies that such an individual has full access and can refer and share components of this identity at their discretion (World Economic Forum 2018).

The SSID concept is similar to our usual way of storing and managing our non-digital identities (The SelfKey Foundation 2017). Today, the vast majority keeps identity documents such as passports, utility bills and certificates of birth or health at homes – safely, securely and under personal control; not be shared with other entities unless necessary. Generally, these important paper documents are

not stored with a third party. Thus, SSID is the digital equivalent of what most of us already do with our physical identity documents.

The Blockdentity framework consists of four key components:

1. *Secure digital wallet*: An identity wallet for the identity owner where the SSID are stored and are used to apply for verification and other services.
2. *Marketplace*: An exchange platform with several participants, ranging from individuals seeking a service to the service providers and the trust party who offer verification and attestation service.
3. *Native Token (BiKi)*: The user's digital "pen" that can be used to apply an identity owner's unique digital signature to documents. It enables the service ecosystem for the exchange of value and information in an efficient and self-sovereign manner.
4. *KYC Enabler (eKYC)*: This facilitates the electronic process of KYC on the Blockdentity platform, eliminating the need for physical forms and submission of physical documents.

These key components coupled with other features, such as application programming interfaces (APIs) or JavaScript Object Notation for Linked Data (JSON-LD) blobs provide the adequate identity sovereignty to users with privacy, security, transparency and individual rights. A combination of these technologies helps to guarantee interoperability, security, ownership control, privacy and linked data portability to identity owners, with the corresponding keys held in the secure digital-identity wallet.

The Blockdentity framework however is designed to work slightly differently for individual users and corporate users. This is to ensure that the platform caters for the respective needs of both types of users. This is further discussed in the next section.

Individual user application

A new user starts with the Blockdentity digital application on a personal device where his identity data is stored in a digital wallet locally on the device. The user is also enabled to make external backup using a personal backup solution. In the digital wallet, the user is required to first set up a public/private key pair (also known as a public-BiKi /private-BiKi). This BiKi serves as the user's digital "pen" that is to be used to apply an identity owner's unique digital signature to documents and assent transactions. The private Biki (private key) is known only to the identity owner, and not even to the Blockdentity platform. It serves to authenticate and validate the owner's identity wherever or whenever such is required in the form of a digital signature, confidentially and securely (without having to appear in person). Looking into the future, this concept of digitally signed attestations will eliminate the need for identity documents as we know them today.

For users to take advantage of the products and services available in the marketplace, they are required to create identity claims[7] and seek attestation from verifiers or relevant authorities such as utility companies, notaries, banks, passport agencies, hospitals, driving licence authorities, immigration, who are empowered to sign the user's claims. Attestations received are machine readable, digitally signed identity claims, which can be stored in the digital wallet. Attestation can also be validated within certain time-windows, if necessary.

It is important to add that identity claims can be signed in such a way that a user could choose to disclose minimal information only. In other words, unlike the traditional method of presenting identity, the identity owner can share precisely what the requesting party needs to know, but nothing more. Thus, minimising the amount of data which needs to be shared to manage the risk of information over-exposure. This instance is illustrated in Figure 18.6. Blockdentity takes a safer and more precise approach to identity information exposure for both the identity provider and the relying counterparty.

As shown erlier, the identity owner is fully empowered to have unfettered control over the information. Hence, he does not have to share irrelevant information which might be unnecessary or sensitive. And the relying counterparty (recipient) does not need to store non-relevant information. This helps with database efficiency, security and a country's regulatory compliance.

Corporate user application

Blockdentity application for the corporate entity is similar to the individual user application, who seeks services from a counterparty. However, and in addition,

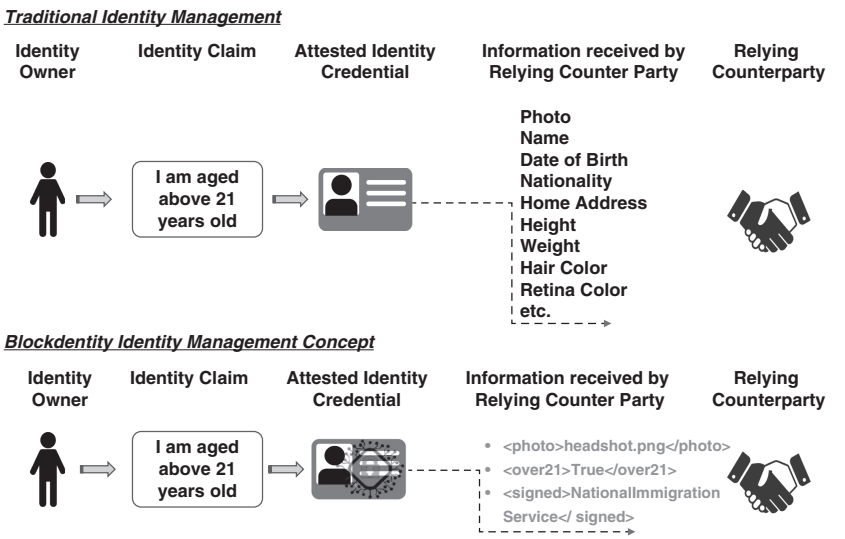

FIGURE 18.6 Personality identity information exposure: Traditional system vs Blockdentity.

corporate entities are regarded as service providers. Hence, the platform is designed to showcase and categorise them in the marketplace where they can be visible for service seekers. In effect, corporate entities could manage their company or start-up documents from the identity wallet. This enables them to do relevant transactions, like opening a bank account, which is usually a tedious and time-consuming process.

Another instance pertains to the onboarding process for a new company, which by regulatory obligation requires a KYC procedure. The KYC procedure is not only implemented on the specific company level but also for subsidiaries and all significant shareholders, which makes the process of documentation and verification extremely burdensome. This is where the advantages of e-KYC are more compelling if linked identities can provide multilevel verification, and it is something a national, centralised system cannot solve.

In the Blockdentity concept, corporate entities can conveniently demonstrate things that are traditionally time-consuming, intensive and difficult for identity owners to prove and cumbersome for relying parties to validate (multiple ownership levels, complex structures, capitalisation tables which can change on a daily basis) efficiently and on instant basis.

Blockdentity: Third-party verification application

Traditionally, entities rely on other entities and institutions to verify their claims or issue attestations on behalf of identity owners, so that they can transact with relying counterparties. This process, which is by and large physical and often cumbersome, is not efficient yet is costly, time-consuming and has a toll on productivity. Examples could be found within the KYC context, with utility companies who still issue paper documents; financial institutions who provide letters of attestation; or company registries who issue paper documents.

The Blockdentity concept presents a value proposition in digitising and monetising this process through the legal and verification service within its framework. This aspect of the framework enables verification using secure communication technology coupled with traceable digital signatures and certificates for trusted verifying parties. Similar to the traditional set-up, the verifying party comprises relevant authorities such as commissioners of oath, utility companies, public notaries, passport agencies, banks, hospitals, schools, immigration, driving licence authorities, who are empowered to sign identity claims or issue attestations. It would be possible for verifiers to issue a fully digital certificate on the Blockdentity platform, which reinforces the transition to a digital economy. This notion is not far-fetched in today's world. In fact, a closely similar concept has been in effect since 2012, when the state of Virginia became the first US state to allow some form of electronic notary. It has now been followed by 17 other states in the US alone and the popularity is growing as more territories look to update their notary laws (Redherring 2017). The US developed a legal framework for eNotarisation in the early 2000s.[8]

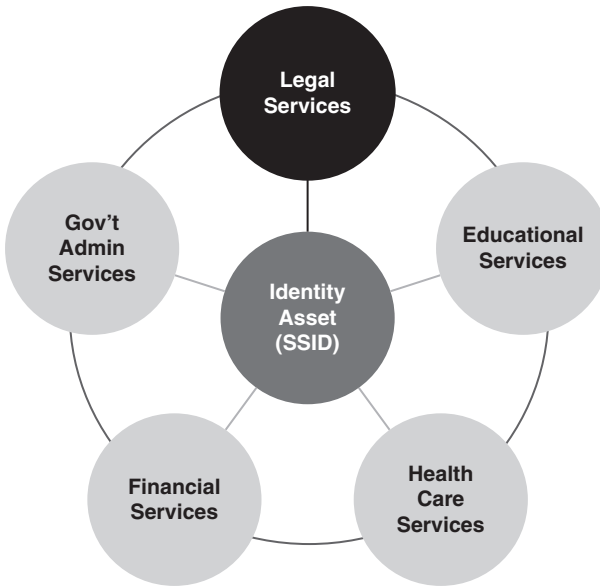

FIGURE 18.7 Blockdentity: Marketplace overview.

Blockdentity: Selected services from the marketplace

A key component of the Blockdentity ecosystem is the marketplace. The marketplace allows the identity or asset owners to interact, share and monitor the relying counterparties who are making use of their authorised public BiKi token. Other components are the KYC enabler, which can either be a standalone or an integrated service, and the SSID.

The marketplace comprises various service providers whose first point of transaction is identity related. As shown in Figure 18.7, these services include financial services such as bank-account opening or insurance-policy application; educational services such as admission application or certificate verification; healthcare services like medical record management; government administrative services such as passport application or attestation; and legal services like notarisation or validation.

The marketplace functions in a two-way demand-and-supply fashion. First, the service providers who showcase their service offerings in the market place for uptake; and second, individual users or identity owners who are seeking the enumerated services.

The marketplace framework reflects on the notion that every individual should have total control over their information and general access to all services available. Furthermore, integrating the system with the SSID allows users to store, manage and utilise their data the way they deem it fit. It allows the users to determine what they share, how they share, when to share and who they share

with. The following services are interlinked and every user has a different interface and special key that allows them to transact seamlessly.

Financial services on the Blockdentity marketplace

As highlighted previously, the process of onboarding a customer for a financial service is far from being simple. It often entails a lengthy and tedious documentation and KYC processes when opening bank accounts, applying for loans, transfer of money, financing or investment. This is as a result of stringent regulatory requirement and market complexity, which has complicated the process of service delivery to customers. It also exposes financial institutions to compliance and reputational risk, and increases operational cost.

Through its marketplace, the Blockdentity system empowers users to gain access to various financial services once they have created and verified their digital assets (identity credentials, attestations, certificates and documents). In the financial service segment of the marketplace, users can apply directly to service providers within the platform. A user seeking a Sharī'ah- compliant service would search for a preferred IFI within the marketplace, review the service requirements, submit an application and get notification or response from the IFI online and in near real-time. The IFI on the other hand, would receive an application from a potential customer, review it and carry out an electronic Know Your Customer (eKYC) procedure on the customer in the most convenient and efficient manner.

The Blockdentity framework offers IFIs and their customers the flexibility to transact online securely. Beyond opening bank accounts online, the public can browse through a range of product catalogues, have access to financial planning tools, advisory services and even opt for an investment at their fingertips. Bearing in mind other services in the marketplace, a customer can get his e-bank statement attested by the bank for another transaction with a different entity within the platform. This is no longer a futuristic image; it is a reality that defines the future of digital identity.

Government services on the Blockdentity marketplace

Government services are another indispensable service in the day-to-day life of every citizen of a country. We all need passports and national identities for various reasons. It is worth mentioning that most of these documents have expiry dates, triggering a renewal process every now and then. The process involved for either obtaining or renewing these precious and must-have documents is not always that smooth. This slow and steady process could be due to the need for thorough verification, due diligence and so forth.

The Blockdentity concept is set to ease the interaction with government services and especially those pertaining to identity management, thus limiting security risk, cost and difficulty. Through its marketplace, individuals can seek

specific government services, such as passport application, and interact with the government authority providing such services. In any case, the application process for such document often requires some additional documents that would need to be notarised and shared with the government body. The Blockdentity platform offers its users the flexibility not only to store and share their personal data, as per need, but also to seek some other legal services such as notarisation within the same secured marketplace.

In brief, the Blockdentity concept provides enormous benefits to individual service seekers and the service providers when interacting in matters relating to government services. It helps to save both cost and time spent for application, while ensuring secure transactions. Consequently, it renders government bodies more efficient and reduces the operational headcount.

Healthcare services

The healthcare services industry is still plagued with data and record issues, as in most cases information and records are yet to be unified across hospitals and across departments within some hospitals. Hence, patients are obliged to repeat the same tests when visiting hospitals at different locations. This is partly due to the fact that our medical records are centrally stored by specific medical institutions, which results in limited access to medical history, with ensuing consequences.

The Blockdentity concept connects healthcare providers across the globe using data APIs, and empowers patients with the access to and management of their medical records. Through the marketplace, users can store safely their personal medical records in their digital wallet and grant precise access to specific pieces of information to whomever they wish at their convenience. In effect, this demonstrates the notion of interoperability, which allows different parties (patients, medical institutions and practitioners) to exchange data securely.

The Blockdentity concept impacts positively on the healthcare services industry as patients save costs and time, which are at the core of medical attention. Also, they can always share their medical history when needed. And, more importantly, practitioners and emergency medical service workers can provide top-notch care and save lives as they can access patients' medical history in real time, particularly during critical conditions.

Educational services

There has been a significant progress in the adoption of technology in education services, yet it is still plagued with several issues on record keeping and authentication. To date, there is no unified and single source of truth, where records and certificates issued by educational institutions or submitted by applicants can be verified. The existing systems are overly centralised and restricted, which impedes integration among educational institutions and between external

entities who rely on the certificates issued by educational institutions. The existing system does not cater for globalisation of education, where students move from one remote part of the world to another to further their studies without going through rigorous verification processes.

Another trending problem in the education services industry is the issue of educational certificate counterfeiting. Most institutions cannot afford the cost of developing, acquiring or maintaining their own anti-counterfeit technology to ensure that their degrees are genuine as issued. Such expenditure may not be necessary if there is single source of truth for every certificate, with its own assigned unique trackable code.

The Blockdentity concept is designed to provide a solution to these problems through a two-way communication feature between the applicant and institution in the marketplace. This allows for secure, digital and timely verification of documents. It decentralises and democratises the data ownership. Through the blockchain technology, the verified document is encrypted and allows for reuse and sharing by the owner using authorised access codes. The framework is set to address the issues of fake certificates and inefficiencies of student application. Most importantly, it saves society from tragedies and preventable errors caused by employment of unqualified individuals to sensitive industries.

Legal services

The legal service is ubiquitous. It is a service required in all transaction dealing, be it financial, education, health or government administrative services. The seal and signature of a legal practitioner or certifier on a document presents a trust and assurance for its users, putting legal services at the core of all other services.

However, there exists some issues of credibility, accessibility and preservation of documents. Today, a legal seal in a document may not translate to ready acceptance of such a document as a genuine version, because it cannot be simply tracked and authenticated. Hence, there is a need for risk rating, which is lacking in the current verification system.

Blockdentity architecture is designed to accommodate all relevant regulations' and countries' requirements. The ownership of the documents is vested in the control owner, where access can be given to all parties more quickly. The framework enables users to verify or conduct legal authentication via a trusted legal verifier with a track record. The verified documents come with unique authentication codes that can be tracked to the trusted legal agent containing details of the transaction. By implication, the procedure, process, transparency and nature of the origin of the verified documents are taken into account, which shows in the risk rating.

In the end, the marketplace is set to be a robust multi-functional platform where multiple transactions can be done with greater efficiency, convenience and at minimal cost. It eliminates existing hurdles with the traditional verification and service application process.

Conclusion

This chapter discussed some of the existing challenges of traditional identity systems and highlights the need for a paradigm shift in defining the future of the digital economy. It therefore proposed a new invention called Blockdentity, an innovative concept for digital identity, and its application in Islamic finance and global finance at large.

The need for IFIs to leverage the capabilities of emerging technology innovations to entice the digital generation and create a pool of loyal customers for their products and services, is quite settled. Doing so is tantamount to empowering the IFIs with tools to provide more self-service capabilities, and making Islamic financial products and services easy and enjoyable for their customers, and as a result, enabling them to attain sustainable growth. The time is right to tap these technological advances to fulfil the ever-increasing needs of the digital generation.

However, as we progress into the digital era, our lives move in unimagined ways and onto the public Internet infrastructure. By so doing, digital trails are established and digital identities are created. Critical to this paradigm shift, on one hand, is the limited application of the digital identity concept and, on the other hand, the risk-exposure of digital-identity owners. More importantly, the control of digital identities is not in the hands of the true identity owners. This raises concern on the maintenance of a delicate balance between a more-secure data infrastructure and an individual's right to privacy, which is promulgated by the ethical principles of Islamic law.

As demonstrated in the chapter, the conventional identity-management systems are based on centralised structures that are by and large inadequate to serve the transactional needs of the evolving digital society. Also, as highlighted, blockchain technology is central to the future of digital identity, but it is only a partial solution. It is the combination of the SSID concept and integration technologies that allows for interoperability of linked data, and granular sharing of specific segments of data are required to enable the individuals to truly own their identities. The Blockdentity concept is, by design, set to adhere to the principles of self-sovereignty, which by implication seeks to shift identity-management from centralised services to management by individuals themselves. This impacts positively on the convenience, efficiency and security in service delivery.

Finally, as expected with emerging technologies, there is no sufficient evidence to identify the one "best" solution. It is important to consider every innovative concept in terms of its anticipated advantages and disadvantages. Hence, further considerations may need to be taken into account, which may not be specifically linked to the Blockdentity concept but are equally important to bear in mind.

Notes

1 General Data Protection Regulation (GDPR) is a regulation in European Union law on data protection and privacy for all individuals within the EU and the European Economic Area (EEA). It was made on 14 April 2016 and implemented with effect from May 25 2018.

2 Quran 2 verses 275 and 276 are two key verses establishing them as core principles.
3 Know Your Customer (alternatively, Know Your Client or "KYC") is the process of a business verifying the identity of its clients and assessing potential risks of illegal intentions for the business relationship. The term is also used to refer to the bank regulations and anti-money laundering regulations which govern these activities (De Smet and Mention 2011). Know Your Customer (KYC) is governed by numerous regulatory provisions across various financial jurisdictions.
4 In the words of Malaysia's Communications and Multimedia Minister Gobind Singh Deo: "We feel if we can formulate a digital ID, it would make it easier to market goods on e-commerce platforms and expand the industry further."
5 CP – Claiming Party in an identification process.
6 RP – Relying Party in an identification process.
7 Identity claims consist of the user's attributes (for example, name, date of birth, nationality, occupation and so on), which are stored in text and object fields (JSON-LD blobs). For convenience and efficiency, the platform is equipped with an optical character-recognition feature that will automatically parse the information from photos or scans of documents.
8 First, all US states were authorised to accept some form of e-notarisation in conformance with the Uniform Electronic Transactions Act (UETA) which was approved in 1999 by its National Conference of Commissioners on Uniform State Law (NCCUSL) as an overlay statute to help reconcile conflicting state laws. Second, the Electronic Signatures in Global and National Commerce (ESIGN) Act was passed in 2000 by the federal government and grants legal recognition to electronic signatures and records if all parties to a contract choose to use electronic documents and to sign them electronically, and it also supports e-notarisation.

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19

BANKING ON ICT

The relevance of online dispute resolution in the Islamic banking industry in Malaysia

Umar A. Oseni and Sodiq O. Omoola

Introduction

With the information and communications technological revolution of the twenty-first century, the way banking transactions are being carried out has dramatically changed over the years. Specifically, the last decade witnessed tremendous growth in non-cash-payment transactions in the global financial system. Three identifiable factors that triggered such growth in non-cash payments are: unprecedented advances in technology; penetration of smart phones and internet usage; and the proliferation of innovative products and services in the banking sector (Capgemini 2014). It is expected that mobile payment transactions will reach an estimated number of 29.9 billion transactions in 2014, based on the projected annual growth of 58.5 per cent. In spite of these successes and projected growth, disputes associated with e-payments are not usually reported as the success rates. Such a paradox reminds one of a bitter-sweet situation associated with financial transactions. The financial industry remains a highly regulated industry which speaks volumes of the paradigm shift in most financial markets towards consumer protection, particularly after the 2007–2008 global financial meltdown (Oseni 2014).

The global Islamic finance industry is undergoing series of reforms, and one of the key areas often emphasised in the literature on Islamic finance is the need for robust legal and regulatory frameworks to avoid misappropriation of funds and fraud in banking transactions that are ordinarily supposed to be Sharī'ah-compliant (Ali et al. 2014). Though different estimates and forecasts have been made by experts, a crude estimate reveals that by the end of 2014, the global Islamic finance industry is expected to attain US$2 trillion in value. Malaysia is at the forefront when it comes to robust legal and regulatory frameworks. In fact, the new Islamic Financial Services Act 2013 (IFSA 2013) of Malaysia is a model

legislation which adopts the interventionist approach of consumer protection, and it clearly restates and provides for electronic payment systems by Islamic financial institutions. Section 2(1) of IFSA 2013 recognises electronic money as a payment instrument. Since 2005, the number of mobile banking subscribers and internet banking subscribers has drastically increased. Of late, there have been series of reforms in the e-banking system in Malaysia, which also includes the Islamic banks. The e-banking initiatives in Malaysia were propelled by a government-backed pilot project through Bank Negara Malaysia (BNM) and the Ministry of Finance-branded MyMobile, which was operated by the Malaysian Electronic Clearing Corp Sdn Bhd (MyClear), a wholly-owned subsidiary of BNM.[1] MyMobile is a government-to-citizens and e-government service premised on the idea of positioning Malaysia as the multimedia super corridor in the region, and transforming the way government services are delivered (Suki and Ramayah 2010, p. 1). The project is aimed at enabling Malaysians to pay for public services such as water, power and telecommunication via their mobile phones and tablets. In addition to making payment for public services, other bill payments for some listed companies can also be made via this service: anytime, anywhere (VSDaily.com 2014).

E-banking on a large-scale is incorporated in MyClear, as it offers large-payment banking services through Real Time Electronic Transfer of Funds and Securities (RENTAS). The services include: real-time gross settlement of interbank fund transfers, multi-currency debt securities settlement and depository services for scripless debt securities. This, among others, is a form of business-to-business e-banking solution. From the available data, in 2011 alone, the RENTAS system settled over 3.4 million transactions amounting to RM47.2 trillion (MyClear 2014a). Another product which has accelerated the pace of ICT-enabled banking in Malaysia is National Electronic Cheque Clearing System (e-SPICK), which is an image-based clearing system where the cheque image and magnetic ink character-recognition code-line data are captured and transmitted electronically to facilitate clearing. The e-SPICK reduces the risk and costs associated with the physical handling of cheques and improves the efficiency of the entire cheque-clearing process. In addition, it also enables customers to receive funds on the next business day (MyClear 2014b). Small-scale payment services handled by MyClear include: fund transfer, e-Debit and point-of-sale transaction for all holders of credit and debit cards in Malaysia. The pilot project was, at inception, set up in collaboration with three commercial banks (CIMB, Maybank and Public bank) but mobile banking activities have since been extended beyond the government initiative, as commercial banks now have e-banking products to cater for the growing demand of their customers (Asian Banking & Finance 2014). The cost implication of deploying mobile banking in the financial service industry is at no real cost to end users following proposal by PIKOMS – the National ICT Association of Malaysia, a not-for-profit organization, for incentives to encourage e-banking activities (PIKOM 2013).

The use of electronic channels for payments of goods and services has increased geometrically in recent times. In a 2013 report from the Central Bank of Malaysia, the changing trend in payment system was acknowledged thus:

> The use of e-payments has continued to expand while the use of cash and cheques declined relative to other payment methods. Nearly 90% of the 1.8 billion non-cash payments (including cheques), amounting to RM17.1 trillion, are now made via electronic means compared to 52.6% a decade ago (Chart 5.8). On average, the number of e-payment transactions per capita increased further from 49 in 2011 to 56 in 2012. This was mainly attributable to the higher use of e-money, debit card, Internet banking, IBG and ATM, continuing the trend which has been observed since 2002.
>
> *(Negara 2014)*

The regulatory agency has done a tremendous job in deploying ICT in day-to-day business transactions. However, a viable method for resolution of e-banking disputes in Malaysia, Association of Southeast Asian Nations (ASEAN) region and the Gulf Cooperation Council (GCC) region, which are the primary domain of Islamic finance, is still quite a mirage. Real-time disputes emanating from electronic transfer of funds require effective technologically driven and sophisticated online dispute resolution (ODR) mechanisms.

There are specific regulations issued by the Bank Negara which relate to payments, medium-of-exchange and electronic payment systems in Malaysia. The IFSA 2013 and the Financial Services Act 2013 provide for the regulation of payment system operators and payment instrument issuers in Malaysia.[2] The supplementary guidelines to promote the safety and integrity of payment instruments are made by Bank Negara as delegated. They are as follows:

(1) Guidelines on minimum security standards for cheques 2004: This guideline specifies the requirements relating to the security features of cheques, governance arrangements, fraud detection facilities and security management in cheque printing.
(2) Guidelines on e-money issued in 2008: It outlines the broad principles and minimum requirements to be observed by all e-money issuers. In addition to imposing a purse-limit on e-money, it also provided for corporate governance requirement for e-money issuers
(3) Guidelines on the provision of electronic banking services by financial institutions 2010: It states broad principles and minimum requirements to be observed and adopted by financial institutions in offering any form of electronic banking services. This guideline further enhances protection of users of electronic banking by requiring the adoption of multi-factor authentication of electronic transaction to ensure safety of online access.

However, resolution of disputes which result from transactions performed via MyClear services is regulated by Guidelines on Dispute Resolution Between Participants of Payments and securities Services. These 2011 guidelines provide for the constitution of an "Independent Arbitration Panel" for resolution of disputes filed against any participant. The panel is to be constituted by five members as follows:

(i) One from MyClear;
(ii) One from BNM;
(iii) Two representing the Association of Banks in Malaysia; and
(iv) One representing the Association of Islamic Banking Institutions Malaysia.

This is an improvement, but inflexible, as it restricts the scope of access to justice in its mono-dispute mechanism. In other words, other alternative dispute resolution (ADR) mechanisms are not employed in this forum (MyClear 2014c).

Malaysia as an Islamic finance hub is gradually becoming the preferred jurisdiction for corporations who seek to list its sukuk in the international market, perhaps for its robust regulatory framework for Islamic finance operations.[3] Settlement of Islamic financial debt securities instrument is performed electronically via Fully Automated System for issuing Tendering (FAST), which is a web-based system that facilitates the issuance of unlisted debt securities and money market instruments regardless of the tenure and mode of issuance (tender and non-tender). FAST interfaces with RENTAS to facilitate the primary market settlement by syncing with the Bursa Malaysia's Electronic Trading Platform for the reporting of secondary trading involving debt securities (MyClear 2014d). The world's largest depository of sukuk instruments worth RM326 billion (about US$108 billion) is handled under the depository for government securities operated by MyClear. In a similar vein, the competition for mobile banking services in Malaysia was, at inception, between MyClear and Malaysian Electronic Payment System (MEPS).[4] It soon became apparent that both MEPS and MyClear offer similar banking services to financial consumers. Therefore, the acquisition of one by the other became feasible and was facilitated through the Central Bank of Malaysia. MyClear has since acquired MEPS in order to complement its systems, mainly: FAST, RENTAS and e-SPICK of the two institutions (MyClear 2014e). Therefore, while drawing insights from the ICT initiatives which have been leveraged in the Malaysian financial system to facilitate payment, this study explores the relevance of ODR mechanisms in ensuring quick, effective, time-efficient and cost-effective dispute settlement in an increasingly digitised environment. It examines the relevance of deploying available ODR mechanisms in the Islamic banking industry in Malaysia. A cursory look at the current trends in the resolution of Islamic finance disputes will be examined. The meaning of ODR and its different models are explained, followed by existing trends in the Malaysian Islamic finance dispute resolution. Regulatory challenges of ODR will be discussed with suggestions for the future of ODR in the Islamic banking industry.

Consumer appeal for mobile and internet banking

The need for a viable ODR platform in the Malaysian Islamic finance industry is overdue as consumer appeal for mobile banking has witnessed a tremendous increase over the years. Acceptability of mobile banking technologies among financial consumers has been positive in Malaysia. In 2011, a survey was conducted across selected countries among online respondents who possessed a bank account and a mobile phone. VocaLink Ltd., a UK-based online and mobile banking technology provider, observed that 56 per cent of Malaysia's financial consumers who participated in the survey expressed interest in mobile payment system, followed by Canada, Germany and Britain with 49 per cent, 47 per cent and 42 per cent, respectively. The survey further reported that:

> some 92% of small-business owners participating in the survey in Malaysia expressed interest in mobile payments, followed by 83% in Canada, 79% in the U.S., 76% in Britain and 70% in Germany. The chief appeal of mobile payments for small-business owners is immediate payment, noted by 82% of respondents in Malaysia, 70% in Britain, 68% in the U.S., 67% in Canada and 61% in Germany.
>
> *(Fitzgerald 2011)*

The survey serves as a pointer for banking technology service providers to tap into the potential market for e-banking services. The appeal among financial consumers in Malaysia, which is ahead of other technologically advanced jurisdictions across the world with respect to acceptability of mobile payment system, serves as a strategic interest of mobile payment service providers. Although a major concern among users and businesses is the security of e-transactions from fraudulent activities, existing regulations have not provided for adequate avenues for seeking redress from online transaction, and dispute resolution has not been a criteria/index for rating e-commerce readiness in Malaysia. But it is interesting to note that the main driving force that propels consumers to embrace the electronic payment system is the immediate payment factor; one might not need rocket science to suggest that such a factor also requires a swift and seamless avenue for seeking redress. This is where ODR becomes imperative in enhancing the consumer-protection provisions introduced pursuant to Section 138 of IFSA 2013.[5]

The vast ICT infrastructural investment deployed by Malaysia within the last decade is unprecedented and this has boosted the country's Network Readiness Index (NRI) second to Singapore among countries in ASEAN (Bilbao-Osorio et al. 2013). The surge of e-commerce activities in the Malaysian economic and social spheres further suggests that the investments in ICT infrastructures and bridging the digital divide made over the years by government is really yielding tremendous results.[6] From the foregoing, one may opine that the sub-index related to law and dispute resolution must consider strongly the use of ODR

in computation of NRI. This will boost the need for a viable and efficient dispute resolution sector in financial services delivery in many countries around the world. The assurance of the existence of a flexible dispute-resolution mechanism will definitely enhance consumer confidence and trust in the e-banking landscape of any country.

Furthermore, there is the need for provision of a cheaper and efficient ODR platform for addressing disputes which might occur between mobile banking technologies companies and consumers otherwise known as banker-to-consumer (B2C) disputes. This is expected to go beyond the traditional feedback and complaint mechanism provided by web-payment systems, which has become a routine aspect of website design rather than a real-time grievance channel. The Islamic financial services industry in Malaysia, with its huge market, is expected to take a large chunk of the e-banking revolution. Analysis of reported cases on Islamic banking disputes in the Malaysian civil courts gives credence to the gloomy uncertainty which could be inimical to future growth in the industry (Oseni 2012). The peculiarities of e-banking and the principles of Islamic finance create a twist in granting access to justice and ensure speedy and cheap dispute resolution via mobile applications and web technologies. ODR is capable of creating a new technology-driven environment for dispute resolution in the Islamic banking industry. Given the provision of an institutional and regulatory framework, it is capable of enhancing access to justice for cross-border e-commerce disputes and small claims.

Current trends in Islamic banking dispute resolution in Malaysia

The Malaysian regulatory and governance framework for Islamic finance has been considered a model for most other jurisdictions due to its proactive approach in introducing sweeping reforms which make the industry not only more Sharī'ah-compliant but also conventionally viable. Over the years, several attempts have been made to introduce reforms in the dispute-resolution framework for Islamic finance transactions in the country. The introduction of Muamalat Bench is a clear example of a non-regulatory approach to alleviate the constraints facing effective dispute resolution in the Islamic finance industry in Malaysia. This has been at the forefront of judicial discourse over the years (Oseni and Ahmad 2016). At present, apart from the widely known litigation process at the Muamalat Bench of the Commercial Division in the High Court of Malaya, there are alternatives to it which are less formal in terms of procedural issues and legal technicalities. Such alternative mechanisms include the recently established Kuala Lumpur Court Mediation Centre annexed to the High Court, Islamic finance arbitration under the KLRCA i-Arbitration Rules 2012 of the Kuala Lumpur Regional Centre for Arbitration, and Financial Mediation Bureau (FMB) set up by BNM, and the Securities Industry Dispute Resolution Centre, which is relevant for the resolution of disputes involving Sharī'ah-compliant securities.

Further regulatory approaches were initiated by the Central Bank of Malaysia with the amendment of relevant laws for the smooth operation of Islamic finance

business and protection of financial consumers (Hasan 2010, p. 82). Principal among such legal reforms are the enactment of the Central Bank of Malaysia Act 2009 and Capital Markets and Services Act 2007. These instruments gave binding force to the role of the Shariah Advisory Council (SAC) of the Central Bank as the highest authority to ascertain Sharī'ah matters relating to financial business within the ambit of the respective legislation. It is however important to add that the constitutionality of such powers conferred on SAC has been challenged in *Tan Sri Khalid bin Ibrahim v Bank Islam Malaysia Bhd* [2012]7 MLJ 597. The matter is currently before the Federal Court for determination. The Chief Justice of Malaysia had earlier given his personal views on the legal tantrums involved in the controversy. He proposed a special tribunal for the resolution of Islamic finance disputes due to the unique nature of such disputes (Zakaria 2013, p. 143). This is expected to save the civil courts from adjudicating on Sharī'ah matters. Such a tribunal will, of course, utilise arbitration and binding mediation in its efforts towards arriving at well-reasoned decisions that can stand the test of time. This is where ODR might be incorporated, particularly when the matter involves online transactions.

Introducing ODR

The nature and meaning of ODR

The development of ADR in the twenty-first century has changed the legal system of many countries forever from mono-door to multi-door courts (Sander 1976, p. 18). Such alternative mechanisms include but are not limited to: arbitration, negotiation, mediation, conciliation, mini-trial and expert determination among others (Sander and Goldberg 1994, p. 49). ADR paved the way for "alternative" or "amicable" methods of settling disputes, thereby affording parties options that best suit their disputes. ADR has grown to become part of the formal administration of justice system as many courts across the world now require parties to resort to ADR, typically mediation, before allowing them to proceed for litigation (Cortes 2011). The widespread acceptance of ADR amongst the legal fraternity, businesses and the general public is not unconnected with the congestion in the traditional court, which results in the high cost of justice, protracted cases, back-breaking technicalities and the lack of confidentiality of court proceedings. In commercial and business transactions, ADR mechanisms have become prominent among legal professionals as the preferred process for resolving offline disputes (Katsh and Wing 2006).

The advent of ICT and its by-products have forever changed the concept of human interaction. Advancement in technology has the effect of automating all sectors of human endeavour. Many traditional businesses and government services have resurfaced as online services, aimed at enhancing delivery of such services. These services can be identified as "Internet based version of traditional services" (Riedl et al. 2011). Digitalisation of almost all aspects of life was a

tidal wave which was viewed in some quarters as replacing human labour with computers, thereby creating a jobless population, while others consider ICT a necessary innovation to enhance productivity and efficiency.

Dispute resolution got its fair share of technological influence through various efforts to apply basic ICT equipment and techniques such as electronic evidence, video conferencing, case-management software and online filing facilities in administration of justice. In the judiciary, this collaboration was initially considered as a necessary tool aimed at aiding justice delivery and enhancing access to justice (Uchenna 2012). The next stage in the interaction between dispute resolution and ICT occurred in the mid-1990s when Villanova University established the Virtual Magistrate, and the University of Massachusetts established the Online Ombuds Office. The Virtual Magistrate Project offered arbitration for rapid, interim resolution of disputes involving system administrators, parties in an online system and those who were harmed by online postings, including files and documents (Cona 1997). ICT tools which were once seen as a partial tool in justice delivery are set to change the role of lawyers and the way the legal profession has been operating for many years (Susskind 2010).

ODR should be viewed beyond mere automation of traditional ADR procedures. The volume of human interaction in cyberspace makes dispute inevitable; as such there must be a viable mechanism for resolving disputes generated from such a medium because cyberspace possesses its own peculiarities and characters considering the nature of transaction and parties involved. The slogan, which says "there is an app for everything", will not hold true if there is no app or web-portal that possesses the ability of resolving e-disputes in real-time.

Irrespective of whether the underlying dispute is generated by face-to-face or electronically generated transactions, ODR has been used partly or wholly in different types of disputes, ranging from family disputes, armed conflict negotiation, business-to-consumer disputes, domain name and workplace disputes (Stewart 2012). The Uniform Domain Name Resolution Policy (UDRP) is one of the foremost ODR platforms for resolution of domain name disputes. This was borne out of the need for swift determination when there is dispute over rightful ownership of domain names following the rules of the Internet Corporation for Domain Names and Assigned Numbers (ICANN) (Thornburg 2001).

E-commerce as a form of borderless market generates its unique disputes among parties who transact virtually in the cyberspace. E-disputes are generated in the course of commercial transactions. The Sharī'ah-compliant businesses which are becoming a major player in international commercial trade are not left out in the e-commerce revolution. With its own genre of disputes, ODR has the potential to resolve the growing number of disputes emanating from the Islamic finance industry.

Different models of ODR

Multiple ADR mechanisms which have been used in Islamic finance dispute resolution can be adapted to establish flexible ODR platforms in Malaysia.

This translates to more methods for seeking redress for financial disputes online without the need for travelling or being physically present at a dispute resolution institution. Accordingly, ODR mechanisms can be categorised into two broad groups, depending on the quantum of online procedures involved in the platform: technology-based and technology-assisted. The different models of ODR are explained in the next section.

Online ombudsman

The word "ombudsman", which means "representative" in Swedish, has been used in modern times to refer to an administrative instrument for receiving complaint from citizens about public actions (Fowlie 2012). Although the modern concept was started in the Scandinavian region of Sweden in 1809, its origin can be traced back to the Islamic era (Hurwitz 1961).[7] This has been operationalised in different sectors to address the complaints of consumers with respect to enforcement of measures and scales. In the Islamic legal tradition, an ombudsman was generally known as muhtasib (public inspector) (Muhmmad n.d.; Zaidan n.d.).

The provision for Financial Ombudsman Service (FOS) in section 138 of IFSA 2013 is a codification of the functions of an ombudsman in the modern context (Lee and Oseni 2015). Ombudsmanship involves receiving complaints from the public and the ability of the Ombudsman to manage the cases to conclusion. Opening of cases can be easily managed via a set of algorithms which has a friendly interface for receiving complaint from financial consumers through the internet-enabled mobile phone. The ODR Ombudsman platform then issues a complaint number for tracking the dispute and continues communication with the complainant via email until the dispute is finally resolved. In addition, while opening a complaint, this ODR mechanism helps to create immediate categorisation for complaints with similar features for statistical purposes, which is readily available to policy makers (Susskind 2010). This procedure is partially included in the existing framework at the FMB, thereby asserting the readiness of the institutional online financial Ombudsman in Malaysia.

Online negotiation or e-negotiation

This is an ODR mechanism which uses advanced electronic support (with or without a video link) to facilitate the dispute-resolution process. This system is the most flexible among other mechanisms as it does not include a third-party online neutral, but a record of the proceedings is kept by an embedded electronic medium for subsequent reference. Online negotiation is fully party-driven because it enables parties to negotiate their own agreements by themselves through an electronic medium. When performed with less sophistication, the email is a useful tool for e-negotiation but in its most advanced form, artificial intelligence applications are involved with full automation (Thiessen et al. 2012).

The online system is programmed to settle disputes within a predetermined number of days; otherwise the financial regulator is notified.

Online mediation

Online mediation makes use of a similar mechanism to that of online negotiation but it includes an active third-party neutral who helps facilitate settlement of the dispute via a technological interface. As with offline mediation, the extent and participation of a third-party and the nature of outcomes are determined by statutes regulating such mechanism.

Online arbitration

Online Arbitration (OArb) is a binding ODR mechanism that incorporates online features with traditional characteristics of conventional arbitration to deliver fast, cheap and enforceable award. OArb can be distinguished from other non-binding ODR methods and has been chosen to possess more potential in banking and consumer ODR among other processes (Schmitz 2010).

Online Med-Arb

This involves the use of hybrid processes, mainly online mediation and online arbitration in the dispute resolution process. Switching between ODR mechanisms is subject to the consent of parties, the need for confidentiality, enforceability of outcomes and the enabling law. The ICANN adopted hybrid processes, that is, Online Ombudsman and Arbitration, in its dispute resolution framework, which incorporates the rules of accredited regional domain name and internet dispute resolution centres across the world (ICANN 2014). Therefore, two different ODR mechanisms can exist under any given framework.

Relevance of ODR to the Islamic banking industry in Malaysia

Automation, usually viewed with hostility among conservatives in labour and traditional services delivery, could be seen in a positive light as a necessity for ensuring quick access to justice and can be used to achieve decongestion of commercial courts. The use of ICT in justice delivery at inception was through the utilisation of basic tools such as video-conferencing, electronic evidence and voice recorders. Such a tool, which was once seen as an aid to justice delivery, is now the new avenue for wholesome success to justice for electronic consumers. Without a robust legal framework to support ODR, the forecasted growth expected in the Islamic finance industry might be a mirage if consumer confidence and trust is lost to small-claims disputes with huge volume (Oseni 2013). To achieve this, the regulatory body must invest more in technology and

information to achieve maximum return and attract a large number of customers across borders. One of the advanced services that has been introduced by banks in the Muslim world is electronic banking or e-banking, which requires a corresponding ODR platform (Salhieh et al. 2011). The following benefits are accruable to the Islamic finance industry when a viable ODR mechanism is deployed.

Immediate access to affordable justice for small claims

Resolution of small-claim disputes is not available in traditional dispute-resolution methods. Monetary limits for filing commercial cases are usually provided for by judicial statute. In the same vein, the growing cost of convening arbitration or any ADR process can be daunting where the claim is less than US$10. This limitation undermines the fundamental principles of access to justice for online consumers who are mostly involved in small-scale transactions.

Access to quality and affordable justice through a timely redress of consumer complaint is one of the peculiar features of an efficient ODR mechanism. The ability to seek redress irrespective of the amount of claim involved in a financial transaction gives an edge over the traditional means of seeking redress by consumers. Where claims are small and seem to be negligible, ODR helps to protect the right of consumers to seek redress online without the need to spend extra cost and time in filing complaints. Consumers with small claims on items which cost less than the amount to be expended on seeking justice are guaranteed adequate protection by ODR providers, who help to mediate between the small-scale consumer and the business through an online medium.

The provision for FOS under the IFSA 2013 encourages fair, accessible and effective resolution of complaints. It is therefore expected that with the new framework, the resolution of Islamic finance disputes will be further enhanced with the deployment of cutting-edge technology; these eliminate challenges posed by distance and the need to travel, thereby reducing cost and facilitating access to justice (Cortes 2011).

Cross-border transactions

The Malaysian Islamic finance industry is fast becoming a major hub which involves cross-border transactions. Financial consumers all over the world seem comfortable to subscribe for sukuk in Malaysia instead of other jurisdictions. This is due in part to the enabling environment created by regulatory bodies with the presence of formidable Islamic finance institutions. How to resolve a dispute, which is a necessary occurrence between a Sharī'ah-compliant business and its offshore consumer, could pose a serious challenge to the existing dispute-resolution institutions. One notable advantage ODR can offer for the growing number of mobile bankers is the ability to seek redress without having to travel across borders physically or be face-to-face. Uncertainty of dispute resolution options available to cross-border consumers is an obstacle to the growth

of e-commerce (Kamaruzaman et al. 2010). Confidence as to enforcement of awards and decisions in online dispute can be achieved through international and regional frameworks for ODR.

Although there are no existing empirical data on the viability of ODR in the Islamic finance industry for obvious reasons, the Organisation for Economic Co-operation and Development published in 1999 a "Guideline for Consumer Protection in the Context of Consumer Protection". The guideline placed special attention on cross-border transactions and encouraged businesses, government and consumer representatives to foster access to justice through ODR in the European Union (OECD 2000). Another regional ODR initiative was proposed by the US Department of Justice to the Organization of American States (OAS) in 2010 to facilitate cross-border ODR in the American region. Under the OAS-ODR initiative, consumers will be able to file online cross-border complaints against a vendor in another participating state (Duca et al. 2012).

Following the consumer ODR initiative launched in the EU, an ODR platform in Malaysia can be the desired foundation for ODR in the ASEAN and GCC regions. Malaysia, being a foremost tourist destination attracting visitors from around the world, seeks to benefit immensely by providing frequent visitors with ODR platforms for seeking redress in the event a transaction is disputed even after such tourists return to their country of residence. This can only be achieved through an efficient ODR platform for all forms of commercial disputes, particularly those related to Islamic finance.

Environmental and economic sustainability

Flowing from the cross-border advantage, the preservation of the environmental and economic resources achievable by ODR mechanism is unprecedented. Capital flights have been expended in accessing justice across borders; this translates to harming the environment via the emission of greenhouse gases, which contributes to ozone-layer depletion and global warming (Ebner and Getz 2012). In addition, the huge amount of paperwork involved in traditional dispute resolution mechanism is against the conservation of forest resources. This is a major environmental advantage which ODR has over other dispute-resolution mechanisms, including ADR. It is suggested that dispute-resolution clauses in green building projects backed by Islamic financing facility should incorporate an appropriate ODR mechanism (Oseni 2014).

Consumer trust and privacy

The overall benefit which an efficient ODR mechanism is capable of offering to the business in a B2C relationship is trust from its customers (Abernethy 2003). The most-often discussed types of trust in ODR are: user's trust in ODR, ODR as trust provider/facilitator and interpersonal trust (Abernethy 2003). In offline dispute resolution, trust is an essential aspect of the dispute

resolution process. The Islamic finance industry is bundled up with ethics, which might be eroded if disputes are not resolved quickly and efficiently. The collaborative effect of virtual online communication between parties in ODR, which guarantees privacy, is capable of strengthening consumer confidence. This is capable of translating into high demand and confidence in the services of the business entity.

Privacy in resolution of disputes helps protect the reputation of the Islamic finance institutions by shutting the public out of disputes, which might have an adverse effect and negative publicity on the Sharī'ah-compliant business. Therefore, the overall benefit of trust goes to benefit both the business and electronic consumers: consumers use more e-services while appreciating the ability to get their complaint resolved fast and painlessly (Van den Heuvel 2000). On the other hand, there are other business benefits, as consumer are willing to pay more when they know a fair and seamless resolution process is available to them, and future relationships are not endangered.

Making a case for technology-driven dispute-resolution mechanism at the FMB

The new legal framework introduced by the IFSA 2013 in Malaysia provides a good basis for such reforms, particularly with the provisions of Section 138 of the Act which introduced the FOS in the Malaysian financial industry (Bank Negara 2013). It thus appears that BNM is already working towards such reforms with a clear indication in the Financial Stability and Payment Systems Report 2012 of the Bank, where it clarifies the function of the "Financial Ombudsman Scheme" within the context of IFSA 2013:

> To further enhance the oversight framework and effectiveness of the arrangements for consumer redress, work is in progress to transform the FMB into a financial ombudsman scheme (FOS) approved under the FSA and IFSA. In ensuring the FOS is fair, accessible and effective, the Bank may prescribe the functions, duties and scope of the scheme including the appointment of directors to strengthen the governance and oversight of the FOS. The scheme will be governed by rules which ensure adherence by members to the terms of membership of the scheme and compliance with the awards granted by the FOS. As part of the transformation, the scope of disputes that can be referred to the FMB [Financial Mediation Bureau] will be expanded, along with the ability to determine a range of remedies or awards to consumers that have been treated unfairly. The proposed transformation will also involve a review of the existing membership fee structure to better reflect the utilization of services of the financial ombudsman scheme by FSPs [Financial Services Providers].
>
> *(Bank Negara 2013, Section 138(1) and (2) IFSA 2013)*

In such a transformation, it is expected that stakeholders will consider the full integration of ODR into the framework for a sustainable dispute resolution process. Such a framework should also take into consideration incidences of cross-border online Islamic financial transactions where local Islamic financial institutions are parties. From the earlier quotation, there is an indication that FMB will be championing the FOS.

The FMB is an institutionalised dispute-resolution body applying multiple ADR processes –mediation and ombudsman – in its operation, which have been merged in a single procedure, targeted at amicably resolving disputes involving customers and their financial services provider. Among the core functions of the bureau is to resolve complaints, disputes and cases reported to it involving any financial services provider and its customer (Bank Negara 2013). The scope of complaint handled by FMB includes internet banking, credit card, debit card and other e-banking services. The flexibility obtainable by financial consumers at FMB is unrivalled as any dissatisfied complainant has the liberty to opt for litigation (Segara 2009). The FMB only deals with a complaint which has initially been lodged through the complaint desk of the financial institution.

In situations where the dispute arose in an online context which may be small claims, it would be extremely difficult for the current dispute resolution mechanism to satisfy the parties. Considering the successes achieved by FMB in resolution of 13,481 banking-related complaints and disputes between 2005 and end of 2011, such success can be more enhanced with provision of ODR mechanism where complaints and disputes can be dispensed without the need for the parties to visit the FMB but facilitated through their internet-enabled smart phones or tablets. Considered as a breakthrough for online and offline financial consumers, the potential of FMB to resolve small claims disputes is untapped. This has placed FMB in an advantageous position for experimenting with ODR in settling B2C disputes in Malaysia.

Procedural steps for an Islamic finance ODR mechanism

This section proposes a step-by-step procedure for the resolution of Islamic financial disputes between financial consumers and financial services providers, through a specially designed ODR system facilitated by an ODR provider or institutional dispute resolution body such as FMB and KLRCA. Each step is explained and further presented in a flowchart for easy understanding (see Figure 19.1).

An ODR System is a secured application used for the submission, acceptance and storage of digital complaint. The system also enables the parties to check the progress of the dispute-resolution process. An Islamic finance ODR system must be in conformity with the nature of Islamic finance transactions, which encourages partnership and joint venture. This also inherently complements the practice of amicable dispute resolution, where the parties may suggest possible solutions or offer settlement. The bank may also seek to avoid reputational risk by pursing amicable resolution.

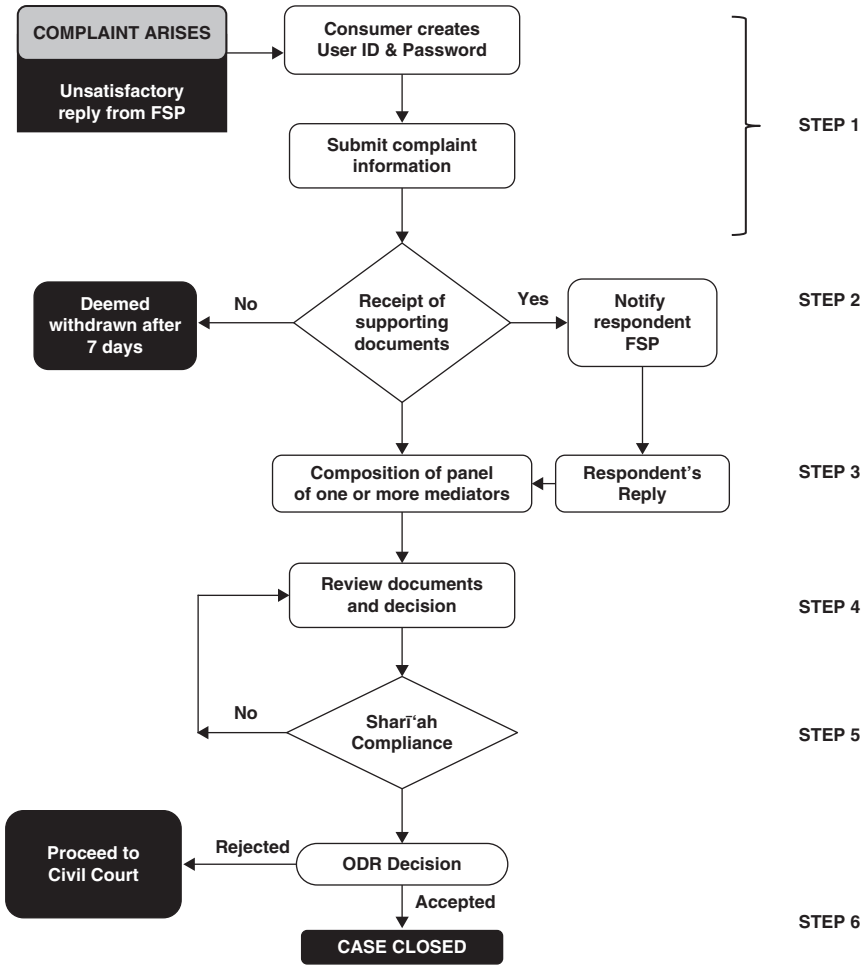

FIGURE 19.1 Proposed Islamic finance ODR flowchart.

The suggestions proposed in this study envisaged the exhaustion of the internal resolution mechanisms of the financial service provider, which can be with or without satisfaction to the financial consumer. Therefore, Figure 19.1 shows the proposed stages for an online com-plaint submission where the financial consumer is unsatisfied with the outcome of the bank complaint and wishes to submit a complaint to the institutional dispute-resolution body such as FMB, KLRCA.

Step 1: Submission of complaint

In order to initiate a complaint, a consumer must create an account in the ODR system or website. Complaint information and particulars are to be supplied into the online form. Upon successful registration, the "user id"

and "password" generated are automatically sent to the email supplied. The login details ensure that the ODR system is secure, and it will be used to access progress of the dispute via web application or smart phone applications. Subsequently, the consumer is expected to enter the complaint information as required by the ODR System.

Step 2: Confirmation of complaint received and supporting documents

The ODR System generates a "Case ID" and notifies the consumer via email, acknowledging the receipt of the complaint. A mediation process can only be commenced with the respondent financial institution when all supporting documents are submitted through the ODR system. The case is deemed withdrawn if supporting documents are not filed within seven days of initiating the case.

Step 3: Notification of respondent's financial institution and reply

Upon receipt of supporting documents, a notification email is sent to the respondent's financial institution in order to avail a proper reply on the case. The respondent may reply to the case either by email or via the ODR system within a specific number of days; extension of time in special cases might be requested. Similarly, the respondent is enjoined to state the settlement offers in their reply.

Step 4: Composition of panel

A panel of one or three mediators or arbitrators is constituted to determine the dispute. The nature of ODR mechanism to be applied to the dispute is determined by the ODR institution and might be based on the choice of parties.

In order to facilitate appointment of panel members, a list of certified ODR experts is maintained by the institution for onward appointment without any delay.

Step 5: Review, decision and assessment

The decision of the panel is made after thorough review of documents submitted by both parties and offers made towards settlement.

However, a Sharī'ah assessor who may be appointed on an ad hoc basis by the ODR institution who must review such a decision. This is to ensure that the decision is in compliance with the fundamental principles of Islamic financial transaction. Where it is found that the decision is against the principles of Islamic law, it will be reverted back to the panel for reconsideration; otherwise it becomes the final decision

Step 6: Confirmation of decision

The decision of the panel is communicated to the parties through the ODR systems. Any ODR decision is deemed confirmed where the complainant did not object to the decision by initiating a court proceeding within specified days (i.e. seven days), after the decision has been communicated to both parties.

Respondents who are registered members of the dispute-resolution institutions cannot appeal the decision. In order to ensure speedy delivery of

justice, each step must be fulfilled within specified days, failure of which is tantamount to abandonment.

Conclusion

The need for a viable ODR platform in the Malaysian Islamic finance industry is overdue, as consumer appeal for mobile banking and its derivatives has witnessed a tremendous increase over the years. Multiple ODR processes such as Online Arbitration, Online Mediation, Online Negotiation will close in on the constraint and difficulties occasioned in resolution of Islamic finance dispute in the civil courts. Access to justice for financial consumers will boost consumer confidence and trustmark in the Islamic finance industry. This will further sustain its continued growth and maintain the vantage place of Malaysia in the Islamic finance landscape. To actualise this objective, an integrated mechanism for ODR through a web-based application and a mobile platform in smart phones and tablets would allow for easy access to justice in cases involving normal banker–customer relationships. This does not rule out the option of litigation in the process, but litigation is considered the last option available to both parties. Malaysia has a good platform to implement this proposal through its FMB, which is set up under the auspices of the Central Bank of Malaysia. Therefore, in order to take the Islamic finance industry in Malaysia to the next level and reaffirm the position of the country as a global hub for Islamic finance, there is a need to design an ODR mechanism to handle the common disputes emanating from the banker–customer relationship. This is a major gap in literature and practice which needs to be filled and developed further in line with modern cutting-edge technology.

Notes

1 BNM is the Central Bank of Malaysia. It was established under Central Bank of Malaysia Act 2009 (CBA), which came into force on 25 November 2009. The Act repealed the Central Bank of Malaysia Act 1958. The main function of BNM is to provide greater clarity to the Bank's mandates on promoting monetary and financial stability, and to exercise oversight over payment systems.
2 The Payment System Act 2003 (PSA), now repealed, provided for an oversight regime for compulsory corporate governance for both operators and issuers of designated payment instruments, which include e-money, credit card and charge card. A critical examination of the PSA's provision shows that the legislation does not provide for any form of dispute resolution framework but is intended to complement the operational arrangement of payment service system providers. With the coming into force of IFSA 2013 (regulates the Islamic financial services industry) and FSA 2013 (regulates the conventional financial services industry), all the relevant provisions regulating payment systems in the PSA have been incorporated into the new laws.
3 Sukuk commonly refers to the Islamic equivalent of bonds. As opposed to conventional bonds, which merely confer ownership of a debt, Sukuk grants the investor partial ownership or share of an asset, along with the commensurate cash flows and risk.
4 Malaysian Electronic Payment System (MEPS) is a payment consortium owned by the domestic financial institutions, including those offering Sharī'ah-compliant

products, to promote the sharing of banking infrastructure. One special feature of MEPS is the Shared ATM Network (SAN) switch, which enables participating banks' customers to access their account through over 20 participating domestic financial institutions and international partners mainly in Southeast Asia.

5 Section 138 IFSA 2013 provides for the Financial Ombudsman Scheme, which is an apparent enabling provision for any dispute resolution initiative, including the ODR mechanism for Islamic finance disputes. The clear provisions of section 138 are reproduced verbatim here:

(1) For the purposes of ensuring effective and fair handling of complaints and for the resolution of disputes in connection with financial services or products, regulations may be made under section 271 to require any class, category or description of financial service providers
   (a) to be a member of a financial ombudsman scheme approved under subsection (2); and
   (b) at all times, to comply with terms of membership of such scheme.

(2) The Bank may approve any financial ombudsman scheme for the purposes of paragraph (1) (a).

(3) Regulations may be made under section 271 for the purposes of ensuring that a financial ombudsman scheme is fair, accessible and effective, including regulations on the following:
   (a) the matters that the Bank may have regard to in determining whether to approve a financial ombudsman scheme under subsection (2);
   (b) the functions and duties of, or other requirements to be complied with by any person operating a financial ombudsman scheme;
   (c) the terms of a financial ombudsman scheme setting out the scope, including types of dispute that may be referred to it and its eligible complainants, membership requirements, application, operations, procedures, the fees that may be charged and the types of award which may be granted under the financial ombudsman scheme;
   (d) appointment of directors of any person operating a financial ombudsman scheme;
   (e) the documents or information that shall be submitted by any person operating a financial ombudsman scheme to the Bank; and
   (f) withdrawal or suspension of an approval under subsection (2).

(4) A financial service provider, who is a member of a financial ombudsman scheme, approved under subsection (2), shall–
   (a) provide documents or information as may be required for the purposes of the resolution of disputes referred to the financial ombudsman scheme; and
   (b) comply with any award granted under the financial ombudsman scheme, including a direction that requires the financial service provider to take such steps in relation to a dispute.

Where a dispute has been referred to a financial ombudsman scheme by an eligible complainant the eligible complainant is not entitled to lodge a claim on such dispute with the Tribunal for Consumer Claims established under the Consumer Protection Act 1999 [Act 599].

6 Since 1997, laws have been passed in Malaysia to enable the deployment of innovative technology in the running of different apparatus government and the economy. These laws are two-fold: first are legislations which have focused on legal recognition, security and privacy of online commercial transaction and communications. The most recent among such legislations are:

Digital Signature Act, 1997
Computer Crimes Act, 1997 Copyright (Amendment) Act, 1997 (also read Copyright Act, 1987) Telemedicine Act, 1997

Communications and Multimedia Act, 1998
Communications and Multimedia Commission Act, 1998
Personal Data Protection Act, 2010

While the E-Commerce Act 2006 did not provide for any dispute resolution mechanism, the Sale of Goods Act 1957 and the Contracts Act 1950 is deemed to be the prescribed law for seeking judicial remedy in the event of e-disputes under this Act.

7 Rehn writes:

> I would like to remind you that the Ombudsman is an intellectual gift from Turkey to modern democracies. Swedish King Charles the Twelfth admired the functioning of this Ottoman institution during his time travelling in Turkey in the early eighteenth century. He established the office of His Majesty's Supreme Ombudsman in Sweden by signing an ordinance in Timurtas, just south of Edirne, in 1713. Now it is time to re-import this excellent institution back to Turkey, after it has undergone several centuries of product development in various other European countries.
>
> *(See Olli Rehn, 'Turkey and the EU: A Win-Win Game' (2008) 7 Turkish Policy Quarterly 19, 20; Stephen Hurwitz, 'Denmark's Ombudsmand: The Parliamentary Commissioner for Civil and Military Government Administration' [1961] Wis. L. Rev. 169, 224–243)*

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PART VI
Future directions

20

CURRENT TRENDS AND FUTURE IMPACTS OF FINTECH IN ISLAMIC FINANCE

Sirajulhaq Yasini and Marifatulhaq Yasini

Introduction

Fintech is a portmanteau of financial technology that includes any technological innovation in the financial sector, such as innovations in financial literacy and education, retail banking, investment and crypto-currencies (Investopedia, 2017a). According to Statista's Fintech Report (iTreasurer, 2017) as cited in iTreasurer, the global transaction value of fintech firms in 2017 was US$3.5 trillion and it is expected to reach US$8 trillion by 2022. Financial institutions face challenges from fintech start-ups by promising their customers faster, cheaper, more convenient and innovative financial services. Hence, 82 per cent of financial institutions are expected to increase their partnership with fintech start-ups with 77 per cent of them expecting to increase internal innovations in their products and system (PwC Global Fintech Report, 2017).

Like their conventional counterparts, Islamic financial institutions around the globe providing Sharī'ah-compliant services are also facing the same challenges from the fintech start-ups. In fact, the recently developed advance fintech products have disrupted the ordinary ways of banking and finance. The new developments allow technology firms and individual experts to make payment methods more convenient, and eliminate the intermediary role of financial institutions through creating peer-to-peer platforms for financing and investments. The fintech wave has also provided alternative currencies through the blockchain technology. Islamic finance has been no exception to this development. We have seen an increasing role for financial technology in enhancing the services of Islamic financial institutions and bringing investors and clients closer to one another through innovative platforms, particularly through crowdfunding.

Similar to previous technological waves, the recent fintech wave comes with its own convenience and challenges for Islamic finance. It accelerates the pace

of financial inclusion by appealing to untapped segments of Muslim societies, enables direct investment in small projects, opens ways for Sharī'ah-compliant finance to be available at the click of buttons from its sources directly, achieves the social finance objectives in better and cheaper ways and makes consumer spending and transfer of funds easier among individuals and between them and financial institutions. It is therefore an opportunity to increase participation in risk-sharing models based on *mushārakah* (joint venture partnership) and *mudārabah* (trust partnership) and to optimise *istisna'a* (manufacturing or construction) and *salam* (forward) contracts in their true spirit and simplest format.

Nevertheless, the new development comes with challenges for regulators, jurists, platform developers and investors altogether. Sharī'ah-compliant fintech solutions require a robust regulatory regime protecting all sides of the equation and ensuring fintech will have a proper environment to operate towards achieving greater objectives of Sharī'ah (*maqāsid al-sharī'ah*). There may be a need for fintech-specific Sharī'ah and Sharī'ah-governance standards by the Islamic finance industry's standard-setting bodies such as AAOIFI and IFSB. Alternatively, there may be a need to cover those issues in their existing standards where Sharī'ah scholars would play an important role in addressing the fintech Sharī'ah-compliance developments.

Regulations, standards and Sharī'ah innovation

The Sharī'ah compliance of fintech-based financial transactions shall not differ from the Sharī'ah compliance of any other financial transactions; hence, fintech-based services need their own regulations and their own Sharī'ah and Sharī'ah-governance standards. Tailored regulations are required to cover both debt and equity-based tech platforms covering systems, controls, risk management, Sharī'ah compliance at the initial point of developing the platform and its activities and investments on ongoing basis, clients' Know Your Customer (KYC), segregation of clients' funds where both Islamic and conventional services are offered, fiduciary responsibilities of the platform and proper disclosures to regulators and clients.

Although many existing Sharī'ah standards of AAOIFI are drafted broadly enough to cover new developments in Islamic finance industry, it is important to consider studying fintech to address any untapped developments through standalone standards or including them in the existing ones. Nevertheless, the regulatory framework is still evolving, and several regulators have created regulatory sandboxes for experimenting with new ideas and developing fintech solutions. They have also explored the type of of appropriate regulations needed for balanced innovation and consumer or investor protection, including their Sharī'ah dimensions (IFSB, 2017). For instance, Bank Negara Malaysia (BNM) has already taken steps by issuing the Financial Technology Regulatory Sandbox Framework on 18 October 2016. This framework provides a conducive environment for the deployment of fintech to foster innovations in the financial

services that can contribute to the growth and development of financial sector in Malaysia. The framework is a very positive move by the BNM, which provides the minimum eligibility criteria for the qualification and registration of a fintech start-up. The Framework's eligibility criteria ensure that fintech start-ups' products, services or solutions have to be genuinely innovative. It further provides that the products and services of fintech start-ups should have the potential to improve the accessibility, efficiency, security and management of risks of the financial services (BNM, 2016).

Like BNM, the Central Bank of Bahrain (CBB, 2017) launched a regulatory sandbox for fintech companies in Bahrain in June 2017. The virtual space enables both the licensed financial institutions and other firms to test their technology-based products and services. Among others, the sandbox encourages genuine technological innovations, customer benefits, customer data protection and ensures that the intellectual property rights of the innovative technology remain with the owner who developed it. The sandbox obliges the applicant of a start-up to fulfil its obligations towards the customers or other parties in case of early termination of the start-up by CBB or by the applicant himself. Nevertheless, CBB will restrain itself from interference with the applicant of the technology and will not give any formal redress even if any customer's complaint is filed with them (CBB, 2017).

Bank Indonesia has also taken similar steps by issuing rules governing the fintech sector which falls under Regulation No. 19/12/PBI 2017 on the Organization of Financial Technologies. The regulatory sandbox allows fintech start-ups to test new products under controlled Bank Indonesia supervision. It includes detailed registration and monitoring procedures. The developments are relevant to all providers, businesses and investors with interests in fintech innovation and online payment systems (Bank Indonesia, 2017). Similarly, the Dubai International Financial Centre (DIFC) launched a fintech sandbox programme in 2017 and continued it in 2018, aiming to attract financial and insurance start-ups where they can test and develop their ideas and technologies.

However, most of these sandboxes do not provide for any specific Sharī'ah requirements, except that the DIFC-based fintech hive is explicit about focusing on Sharī'ah-compliant fintech amongst its focus areas. Since fintech is growing exponentially and getting adopted by not only the conventional financial industry but also the Islamic finance industry, regulators need to take further steps to introduce stronger and more comprehensive regulations which will also provide for the Sharī'ah requirements that would need to be observed in the development of fintech products and services.

Sharī'ah scholars, as well as the industry's standard-setting bodies and freelancers, are expected to work towards surmounting the challenges of new developments in fintech solutions in Islamic finance. That is, it is imperative for Sharī'ah scholars to study the emerging issues in fintech solutions and applications that require Sharī'ah guidance through contemporary *ijtihad*, just as they did during the early stage of the Islamic finance industry. For instance, jurists shall decide

to what extent the use of blockchain technology in cryptocurrencies and other fintech solutions, such as automation of sales and robo-advisory are acceptable, or if sectoral and financial screenings apply to the investments made by fintech platforms in small enterprises, and whether those investments can be leveraged and what methods of leverage shall be acceptable. They will need to also evaluate the compliance of any combination of Sharī'ah concepts or contracts used in structuring fintech-based products.

Sharī'ah assurance

It appears most fintech solutions in Islamic finance do not provide initial or ongoing Sharī'ah assurance to their clients. In the absence of a proper regulatory regime and governance standards, and given that this wave is driven by technology experts who are not necessarily familiar with the governance structure of Islamic finance, fintech companies may not feel obligated to provide such assurance, thereby exposing themselves to reputational risk. For instance, on the one hand, equity crowdfunds that are active these days should consider how they ensure the Sharī'ah compliance of the various projects they invest their clients' funds in and how they manage excess liquidity.

On the other hand, not all fintech platforms will require the same level of Sharī'ah assurance. E-trade platforms and stock investment apps, for instance, require both initial Sharī'ah approvals of the platform/technology itself to ensure the embedded financial intelligence is Sharī'ah compliant, and on an ongoing basis to ensure the compliance of its activities such as Letter of Credit/Letter of Guarantee issuance, peer-to-peer financing, and stock selection/purification. Some other platforms, such as automated commodity brokerage platforms, only require vetting at the set-up stage because their services do not float.

Therefore, for Sharī'ah assurance, a fintech platform may appoint a Sharī'ah Supervisory Board to oversee its activities/investments if it is big enough or hire the services of a Sharī'ah consultancy or a freelance Sharī'ah scholar to oversee its initial set-up and ongoing activities and future improvements.

Enforceability of fintech contracts

Fintech is a new type of investment in the virtual sphere. Hence, there is no specific corporate identity, which makes it difficult for it or its end users to have recourse to the courts. This is due to the fact that when contracts take place on a particular platform, it becomes difficult to determine the courts that have jurisdiction and the governing law in the event of breach of contract or in case of delay in payment of profit or default, because the contract is signed with a project owner who resides in a different jurisdiction (Baddou, 2018). Therefore, one way to fill this lacuna is to include the option of resorting to binding alternative dispute resolution (ADR) methods such as arbitration, which must be enforceable across borders.

Financial inclusion

One of the objectives of Islamic finance is to bring more people inside the financial system in order to make the financial services easily accessible to all segments of the society. But bringing more people inside the financial system is not an easy task. Islamic financial institutions can benefit from fintech by developing products that can be easily accessed by everyone in any part of the globe which should also be cost effective, for example, mobicash in Pakistan, M-pesa in Kenya and "TransferWise" in the United Kingdom. Fintech can also provide a solution to the non-banking population through financial innovation like Aire in the UK. Aire is a credit assessment service helping financial institutions to make "more informed" credit decisions to enable credit approvals of those usually denied financing facilities; it is offering a second chance to rejected customers. The SMEs can also get easy funding access through fintech such as iwoca in the UK that offers flexible financing facilities to the SMEs across Europe. Therefore, fintech enables customers that were previously excluded from the traditional financial system by enhancing infrastructure, developing new products, lowering costs and allowing them to enjoy the same standards of services as other customers. Although some of the aforementioned fintech may be used in a Sharī'ah non-compliant manner, they could be replicated by the Islamic financial institutions to provide Sharī'ah-compliant solutions to promote financial inclusion.

Contemporary practices of fintech and their future impacts on Islamic finance

This section examines some examples of fintech's current and potential future impact on Islamic finance. Though some of these examples have been discussed in earlier chapters, this section takes a different approach by briefly examining the current trends and identifying potential impact and future perspectives.

Tawarruq *platforms*

Tawarruq or commodity *murābahah* brokers' platforms are a good example of fintech exclusively benefiting Islamic financial institutions. It has been only a few years that commodity *murābahah* platforms that support *tawarruq* transactions have been automated. A few years back, they used to manually process the purchase and sale for commodity *murābahah* transactions. The automation now has eliminated many operational risks, minimised the execution time and efforts, reduced costs and enabled clients to receive cash quicker and in a more efficient manner. With the rapid growth of blockchain-enabled smart contracts, it is expected that trading platforms will further develop their systems and adopt blockchain-enabled smart contracts which will self-regulate, minimising further human intervention and reducing the operational risks and costs.

Blockchain, smart contracts and robo-advisory

Blockchain technology could be used for the automation of contracts and advisory services. If this happens, it will help streamline Islamic finance product-development processes. For instance, blockchain can further automate the *tawarruq* process through blockchain ledgering and can enable automated sale of commodities between various parties. At some point, it may even eliminate the intermediary role of commodity brokers, bringing down the cost of *tawarruq* significantly. It can further help to enhance the Sharīʿah compliance of *tawarruq* transactions by ensuring the commodity would not return to the same initial seller in the next leg or legs of the transaction without any human intervention. Moreover, blockchain offers a distributed ledger that protects the contracts from deletion or amendments after they are executed. The direct interaction between the parties, and the protection that blockchain ensures, will eliminate the role of many intermediaries such as lawyers, brokers and accountants. The Islamic wealth-management space is already using robo-advisory for making investment decisions more convenient. With the help of artificial intelligence we can also imagine a world of Sharīʿah robo-advisory where Sharīʿah advice with minimal human intervention is received through software.

Smart sukuk

Sukuk are "certificates of equal value representing undivided shares in ownership of tangible assets, usufructs and services, or (in the ownership of) the assets of particular projects or special investment activity" (AAOIFI, 2015). The main players in the Sukuk market, the volume of which was US$116.7 billion in 2017, are governments and larger corporations for big institutional or high-net-worth investors. On the other hand, very limited number of retail sukuk have been issued around the world by small companies or retail issuers for retail investors, compared to sovereign and corporate sukuk issuances, due to the limitation of the small companies and the limited access that retail investors have and the risks associated with retail sukuk. Blockchain smart sukuk could help make sukuk issuance smarter, easier and more accessible to retail investors. An example of smart sukuk is Sukuk Al-Istisna Al-Ijara which was issued by Bloosom. The smart sukuk runs on the Ethereum blockchain which support smart contracts. The smart contract encrypts the business rules directly into the underlying payment currency and the blockchain enforces the contract's rules regarding payments and transfer of ownership (Blossom, 2018). Thus, smart sukuk can be used by small and big institutions to raise funds by issuing smart sukuk which could help the Islamic finance industry grow further and it will also result in increased financial inclusion as the investor base widens.

Internet of things (IoT)

The IoT can play an important role in enhancing Sharīʿah compliance of transactions by enabling the effective use of Sharīʿah concepts and ensuring the purpose

of finance. For instance, in a goods *murābahah*-based letter of credit, if a bank opens an import letter of credit for its client and would like to ensure it only sells the goods to the client after the goods have arrived at the port or in warehouse or after the laboratory or quality control authorities approves the goods, IoT can help in tracking and locating those particular goods. If IoT is combined with a smart contact embedded into the process, the *murābahah* transaction can be made much more efficient and the purchase and sale can be automated and executed instantly, subject to the fulfilment of the IoT-related smart instructions in the contract.

Another example where IOT can enable a better Islamic finance product development is financing retail products such as TVs, refrigerators, furniture, etc. Retail stores often find it difficult to identify the item sold through *murābahah* because of having the same multiple items in their stock, making it difficult to deliver the same item to the customer. This poses a challenge for the financial institutions to finance an object via *murābahah* because while it can purchase the item based on *wasf* (description) from the supplier (retail store in this example), for onward sale to the customer it will need to specify the item; it cannot sell it again based on *wasf* because its onward sale will be invalid for *gharar* (ambiguity) of the subject matter. In the world of IoT all items will be easily identifiable and traceable and hence no *gharar* will occur.

IoT can also help in ensuring regulatory compliance and minimising fraud. In the previous example, if the goods are intended to be delivered to a non-sanctioned country and the importer wants to divert the same or re-export it to a sanctioned jurisdiction, IoT will help suppliers and financiers prevent such irregularities because the goods can be traced.

Peer-to-peer platforms

These are the most-used fintech models in the form of both loan and equity-based crowdfunding in the conventional finance space, eliminating the intermediary role of financial institutions and creating a direct link between investors and clients (lenders and borrowers). The loan-based crowdfunds did not fly well in Islamic finance space, but the equity-based crowdfunds have done well due to the fact that they fit within the Islamic finance philosophy and are accepted by the public for benefiting real-time initiatives. However, loan-based crowdfunding will not work perfectly in Islamic finance unless based on *a tawarruq* model or other engineered combination of concepts. But this can be combined with equity-based platforms to leverage its investments and maximise its cash base in which the commodity *murābahah* brokers and their electronic platforms can join hands with peer-to-peer platforms. Although there have been some attempts around the world for the introduction of such Islamic peer-to-peer platforms, its success is yet to be seen. In fact, Beehive is one of the first Sharī'ah-compliant peer-to-peer financing windows for SMEs. It processes investments in a Sharī'ah-compliant way and offers a commodity *murābahah* platform which

allows Islamic investors to buy and sell commodities at a profit and on a deferred payment basis (Beehive, 2018).

Peer-to peer platforms will help reduce the cost of investments by eliminating the intermediary role of financial institutions, fund managers and brokers and therefore maximising investor profits. The cost of finance will be reduced due to lower funding costs as fintech platforms will rely on a smaller number of employees and more on automated processes and robo-advisors.

Peer-to-peer platforms will diversify the investment opportunities for investors by giving them access to a wider customer base in more than one jurisdiction at the same time and hence a wider base of investors to its clients.

Islamic social finance

Islamic social finance is one of the most crucial parts of Islamic financial intermediation. There are many products and models of Islamic social finance like *zakat* (obligatory alms), *sadaqah* (voluntary alms), *waqf'* (trust), etc. The institutions of *zakat* and *waqf* had played a significant role as the source of fiscal policy throughout Islamic history. These institutions provide the basis for Islamic philanthropy. From an Islamic social behaviour perspective, solidarity and cooperation is the central norm, along with social and business ethics. But at the same time the Islamic financial system has other institutions which are directly linked with the poor classes in the society, e.g. Islamic microfinance, which has a main social element but at the same time also has a profit motive to sustain business operations, while some have only social motives like *qard hasan* (benevolent loan), *kafala* (guarantee), etc.

There is immense poverty and inequality in today's world. In order to address these issues in the world in general and in the Muslim world in particular, Islamic social finance can play a substantial role, as its main objective focuses on addressing the scourge of poverty and raising the standard of living of the deprived class of the society (IRTI, 2017). The impact of Islamic social finance combined with contemporary technology could better achieve the objectives of Islamic social finance because technology will help, on one hand, to reduce the cost of providing Islamic social financing services through simple ways, but, at the same time, it will make Islamic social finance more inclusive.

Furthermore, philanthropic initiatives related to *zakat*, *awqaf* (pl. of *waqf*) and microfinance always attract more small and medium-sized investors when compared to large entities due to less complicated risk and credit matrix and processes, in addition to individuals being more concerned about the hereafter and rewards from Allah than legal entities. The impact of peer-to-peer platforms can be maximised to support microfinance initiatives. Fintech can be used in a larger scale to replicate Islamic versions of Grameen Bank. A platform can combine the services of *zakat* and *awqaf* to provide microfinance services.

With the exception of some jurisdictions, *zakat* today is mostly not collected or distributed in an organised manner. Perhaps it is the biggest social-responsibility

failure of the modern era – Muslims not being able to effectively use *zakat* for the purposes it has been obligated. Fintech can play a vital role in the effective collection and distribution of *zakat* in an efficient and sustainable manner to the groups of legal recipients. *Awqaf* on the other hand, requires effective management and, in many instances, finance to revive and maximise profits. Fintech can raise funds for financing *awqaf* on risk-sharing or short-term bridge financing basis. The recently introduced Finterra Waqf and Endowment blockchain is a potential tool to bridge this gap of financing deficit for the development of *awqaf* properties.

Takāful *(Islamic insurance)*

Like the conventional insurance industry which is undergoing technological revolution, the *takāful* industry needs to adopt digitally innovative products and services to improve customer experience and pricing. This could be done by way of adopting Insurtech. Insurtech is the blend-word of "insurance" and "technology" which refers to the use of technology innovation to squeeze out savings and efficiency from the current insurance industry model (Investopedia, 2017b). This customer-centric innovation is an attempt to improve customer experience, cost effectiveness and data protection (Maunders, 2018) which could be adopted by the *takāful* industry to further improve the Sharī'ah-compliant products that they offer.

Takāful (although originally it literally means solidarity) is offered as a Sharī'ah-compliant commercial enterprise for providing protection to its participants. Rarely does a *takāful* company distribute surplus to its participants – if any surplus is left after covering participants at the end of *takāful* period – or puts the participants' interest ahead of its shareholders. Fintech can change the nature of Islamic insurance by introducing "crowd-*takāful*", eliminating the role of commercial enterprises where participants bear the actual cost of the services, provided the surplus is kept in their accounts for future utilisation towards their contribution (*tabarru*) or allowing them to withdraw the same should they wish to end their participation.

Conclusion

Fintech comes with convenience and numerous challenges for the Islamic finance industry. Nevertheless, the challenges will be surmounted like those of the past, and fintech developments will hasten the swiftness of the development of Islamic finance and it will look more attractive to an unexploited part of Muslim societies, due to the fact that it will aid the availability of direct Sharī'ah-compliant investments, finance, *takāful* and charity at the click of buttons, make consumer spending and transfer of funds easier and help enhance Sharī'ah compliance and advisory.

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