

The Role and Potential of Blockchain Technology in Islamic Finance

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Abstract

Blockchain is the underlying technology upon which cryptocurrencies such as bitcoin are built. Cryptocurrencies have received significant attention in recent years. This focus has obscured the real technical innovation in data storage and retention – that of the so-called ‘blockchain’ digital architecture. Blockchain – also known as ‘distributed ledger technology’ (DLT) – has the potential to change much more than the realm of conventional financial services. The ability to transfer, store and record non-fungible bits of information is an important technical accomplishment that brings the economic dynamics of supply and demand to the digital sphere. This article examines how DLT is (and may in the future) influence the world of Islamic finance. We argue that blockchain has the ability to mediate and harmonise differing sharia-compliance regimes thus opening up a single digital market for Islamic financial products and services.

Keywords

Fintech, Blockchain, Distributed Ledger Technology, Islamic Finance, Shariah-compliance, Cryptocurrency, Bitcoin, OneGram, Financial inclusion, Sustainable Development Goals (SDG).

I. Introduction

Combining innovative technological developments such as blockchain with the grand traditions of Islam may initially seem odd and anachronistic. There is nothing anachronistic, however, about the fast and innovative changes happening in the world of Islamic finance. The market for Islamic finance has had, in recent years, significant

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annual growth of around 10-14%.¹ Although the growth of the Islamic finance industry is forecast to decelerate due to the ongoing Covid-19 pandemic, the industry assets are projected to increase steadily to US\$3.69 trillion by 2024.²

The steady growth in Islamic finance is mirrored in the more recent proliferation of technology in the financial services space.³ The innovations and market potential represented by FinTech and RegTech have the capability to revive interest in Islamic Finance and underscore the difference between Islamic finance and conventional finance to an even greater degree.⁴

This article explores how blockchain technology can reinvigorate Islamic finance and render it even more effective in its reach and stated ends. Blockchain is a natural technological compliment to Islamic financial arrangements in that it helps data storage and retention methods enhance trust, reduce fraud and promote honesty in the digital economy. Trust, honesty and transparency are all virtues that Islam and many other religious traditions hold sacred. Building the future of Islamic finance on such ostensibly pure foundations is both appropriate and necessary such that Islamic finance is not only part of the changes currently taking place in the world of finance, but at the *avant-garde*.

II. The Global Islamic Finance Landscape

Following the wave of de-colonisation in the 1960s, Islamic finance emerged in the 1970s in Southeast Asia and parts of Arabia.⁵ Its development was not so much the ‘re-emergence’ of any historical institutional arrangement, but rather the evolution of a new phenomenon combining traditional Islamic teachings and contemporary commercial arrangements.⁶

¹ *Islamic Finance Development Report 2020* (ICD-Refinitiv) at 7, [hereinafter *ICD-Refinitiv Report 2020*]. Available at: <https://icd-ps.org/uploads/files/ICD-Refinitiv%20IFDI%20Report%2020201607502893_2100.pdf> (last accessed on 8 February, 2021).

² *Ibid.*

³ Douglas W. Arner, János Barberis & Ross P. Buckley, *FinTech, RegTech, and the Reconceptualization of Financial Regulation* 37 (3) *Northwestern Journal of Int'l Law & Business* 371 (2017), [hereinafter Arner, Barberis & Buckley].

⁴ See for an articulation of the differences between Islamic finance and Conventional banking, Asma Salman & Huma Nawaz, *Islamic Financial System and Conventional Banking: A Comparison* 13(2) *Arab Business and Business Journal* 155 (2018). Available at: <<https://doi.org/10.1016/j.aebj.2018.09.003>> (last accessed on 16 February 2021).

⁵ See David A. Suratgar, *Forward: The Impact of Islamic Banking on World Financial and Commercial Relations* 16 *Law and Policy International Business* 1089 (1984). [Hereinafter Suratgar]. Suratgar discusses the role of Western banks and banking interests in establishing the decolonized states with ‘weak leaders’. Those leaders then granted generous concessions in key industries such as banking and oil.

⁶ Haider Ala Hamoudi, *You Say You Want a Revolution: Interpretive Communities and the Origins of Islamic Finance* 48 *Virginia Journal of International Law* 249 (2007). [Hereinafter Hamoudi]. Hamoudi argues that earlier Islamic scholars that were seeking a ‘third path’ between Soviet-style socialism and unconstrained capitalism contributed to the discourse that gave rise to Islamic finance.

Globally, the Islamic finance market is worth around \$US 2.88 trillion.⁷ Importantly, ‘Islamic finance’ is an umbrella term that includes many various sectors, products and forms of financial arrangement. These are primarily:

1. Islamic banking (worth apx \$US 1.93 trillion or 69%)
2. Islamic insurance arrangements (*takaful*) (worth apx \$US 51 billion or 2%)
3. Islamic bonds (*sukuk*) (worth \$US 538 billion or 19%)
4. Islamic Funds (worth \$US 140 billion or 5%)
5. Other Islamic financial institutions (worth \$US 153 billion or 5%).⁸

Presently, Malaysia, Indonesia, Bahrain, UAE and Saudi Arabia have the most well-developed Islamic finance markets.⁹ There are approximately 1526 Islamic finance institutions, 1749 Islamic funds worldwide and 3420 outstanding Islamic bond instruments (*sukuks*).¹⁰ The number of countries with Islamic finance regulation has reached 46. Fourteen of these countries have central *shari’a* boards with 1170 scholars representing them.¹¹ It should also be noted that Islamic financial institutions disbursed US\$1.16 billion for corporate social responsibility activities.¹² Interestingly, in recent years non-Islamic markets have witnessed some of the most rapid growth in Islamic financial products and services.¹³ In Europe for example, Luxembourg, the Republic of Ireland and Jersey all host large numbers of Islamic funds, and multiple European countries are committed to ethical investing as well as to promoting bilateral trade with MENA nations.¹⁴

A. Core Principles of Islamic Finance

Islamic finance refers to financial practices that uphold the tenants of the Islamic faith. In order to adhere to the requirements of Islamic finance, financial services and products must be ‘*shari’a* compliant’ or consistent with Islamic law. *Shari’a* law is derived from the core teachings of Islam as contained in the Holy *Quran*, the collected sayings of the Prophet (peace be upon him) (*Hadiths*), and the records of how he lived his life attested by reliable witnesses (*Sunnah*). Founded on normative principle of right and wrong, in recent decades, those grand objectives have eroded. As noted by Hamoudi,

⁷ ICD-Refinitiv Report 2020, *supra* note 1, at 24.

⁸ *Ibid.*

⁹ *Ibid.* at 12.

¹⁰ *Ibid.* at 22, 38, 42.

¹¹ *Ibid.* at 50.

¹² *Ibid.* at 56.

¹³ Chlow Domat, *Islamic Finance: Just for Muslim –Majority Nation?* (05 November 2020), *Global Finance*, <<https://www.gfmag.com/topics/blogs/islamic-finance-just-muslim-majority-nations>> (last accessed on 21 January 2021).

¹⁴ Deloitte, *Islamic Finance in Europe: Trends and Prospects* (2014). Available at: <<https://www2.deloitte.com/lu/en/pages/islamic-finance/articles/islamic-finance-europe.html>> (last accessed 8 March 2021); European Central Bank, *Islamic Finance in Europe* (Occasional Paper Series, 146/June 2013), available at: <<https://www.ecb.europa.eu/pub/pdf/scpops/ecbocp146.pdf>> (last accessed 8 March 2021).

preceding years have witnessed *shari'a* compliance tending towards legalism and adherence to differing and alternative schools of interpretation.¹⁵

Although differences exist amongst the various schools of Islamic jurisprudence¹⁶, the core principles applying to commercial and financial practices are essentially universal within Islam. Those core principles bind financial practices to the betterment of man and the betterment of society. Importantly, all financial arrangements must also always be bound to the real economy in some way. Islamic finance represents a kind of 'socio-economic idealism'.¹⁷ Finance, according to Islamic teachings, should not be an end in itself, nor should it be an exploitative, wealth generative and self-perpetuating enterprise. Islamic finance, at its heart, it is argued, ought to be rooted in material or spiritual growth and the promotion of social harmony.¹⁸ As Hamoudi notes, despite the variations in interpretation, as regards core beliefs: '[g]iven the near unanimity of Islamic Theologians on this matter, it would be fair to say that the entire intellectual movement of Islamic finance rests on such ideas'.¹⁹

Perhaps the three core and guiding principles of Islamic finance that are commonly accepted are:

1. Financial investments, products or transactions ought not be overtly speculative or uncertain or contain risks making them akin to gambling.
2. Financial investments, products or transactions ought not to be interest generating. Interest is money made by means of lending money and is therefore unconnected to the real economy and unproductive in a real economic sense.²⁰
3. Partners in an investment should share both the risks and efforts as well as the potential profits in an investment.

When determining whether innovations in Islamic finance (technological or otherwise) are *shari'a* compliant, it is against these core principles that Islamic scholars measure such developments.

¹⁵ Hamoudi, *supra* note 6, at 252. See also Walid S. Hegazy, *Contemporary Islamic Finance: From Socioeconomic Idealism to Pure Legalism* 7(2) *Chicago Journal of International Law* 582 (2007).

¹⁶ There are differing interpretations of *sharia* arising from different schools of thought and jurisprudential traditions – these alternative schools of thought are known as *Madahib* (the singular being *madhab*). The differences between these *Madahibs* lie not in the fundamentals of faith, but in inner judgements and jurisprudence, which are the result of the independent reasoning of imams and the scholars who followed them. The interpretations of *sharia* principles by religious scholars of one school of thought or another result in decisions called *Fatwas* meaning 'religious edict'.

¹⁷ Hegazy, *supra* note 15.

¹⁸ See Kimberly Tacy, *Islamic Finance: A Growth Industry in the US?* 10 *North Carolina Banking Institute* 355 (2006). Tacy provides a comprehensive list of Islamic finance terms, their meaning and underlying purpose.

¹⁹ Hamoudi, *supra* note 6, at 252.

²⁰ Some schools of thought differentiate between interest generated on loans intended for enterprise vs interest generated on loans intended for consumption. For the types of interest in Islamic Finance, see Muhammed Al Hasani, *Analysis of the Types of Interest in Islamic Law* 36 (4) *Journal of Islamic Banking and Finance* 33 (2019); Camille Paldi, *Understanding Riba and Gharar in Islamic Finance* 2 (1) *Journal of Islamic Banking and Finance* 249 (2014).

B. *Structural Challenges Facing Islamic Finance*

Historically, one of the main challenges hindering the growth of Islamic finance, particularly into developed banking markets, is the issue of ‘certainty for depositors’. As outlined in the mid-1980s by then Governor of the Bank of England, Mr. Robin Leigh Pendelton,²¹

A central feature of the UK banking system, and one of which is now enshrined in our legal framework, is that of capital certainty for depositors...One of the crucial principles underlying Islamic banking...is that... depositors should share fully in the fortunes of the institutions receiving their funds...there usually appears to be no capital certainty for the depositor as to his original deposit, nor certainty as to the rate of return.

The Islamic finance sector did eventually overcome the ‘depositor certainty’ issue through the development of coherent Islamic banking principles designed to meet the requisite levels of prudential certainty to the satisfaction of UK regulators. New challenges, however, abound for the Islamic finance sector. As financial arrangements have become more complex and digital innovations are transforming all manner of financial services, there is mounting pressure on the Islamic finance sector to overcome internal tension and modernise. Technological innovations, by their very nature, solve problems, overcome challenges or improve on the former state of the art in a particular field. Customers of Islamic banking all now expect, in addition to *shari’a* compliance of their products and services, modern online digital tools commensurate with conventional financial platforms.

Two problematic issues arising from technological innovations for both conventional and Islamic finance are digital currencies and trans-jurisdictional compliance in a fragmented jurisprudential context. Indeed these two issues (cryptocurrencies and *shari’a* compliance) have the greatest potential to benefit from the arrival of blockchain technology and its ability to overcome and smooth-over associated frictions.

III. **The Emergence of Technology and Islamic Finance**

The FinTech revolution has not missed Islamic finance.²² Indeed, entrepreneurs are developing financial technological innovations that target the unique pain points associated with Islamic finance such as *shari’a* compliance transparency and the requirements of links to the real economy. To that extent, Islamic finance may actually provide greater opportunities for FinTech innovations than is generally thought.

²¹ Suratgar, *supra* note 5, at 1089-1090.

²² See Nassif Alam, Lokesh Gupta and Abdolhossein Zamani, *Fintech and Islamic Finance Digitization, Development and Disruption*, 81 (Cham: Palgrave Macmillan, 2019). See also, Mohd Ma’Sum Billah, *Halal Cryptocurrency Management* (Cham: Palgrave Macmillan, 2019).

Technological developments are reshaping financial markets globally.²³ The Islamic financial sector is not immune from this phenomenon. Robo-advice for *sharia*-compliant ETFs (Exchange Traded Funds), for example, are using AI technology to meet the investment needs and preferences of Islamic investors.²⁴ Other Islamic financial arrangements, such as *sharia* compliant mortgages,²⁵ may also benefit greatly from technology. For example, amortisation rates, or ‘sliver’ transfers of percentages of property ownership over time (an *Ijaraa* scheme based on a rental arrangement) and other similarly elaborate Islamic financial arrangements can all be simplified and graphically represented with the aid of technology.²⁶ These are only two of the many potential use-cases for emerging technologies and Islamic finance. In many respects, Islamic FinTech is no different from mainstream FinTech with aspects such as the importance of the user experience (UX) playing a role.

Blockchain technology, therefore, plays into this broader dynamic of opportunities and obstacles and is relevant on both sides of the equation. Blockchain may open up new markets and opportunities for innovators, but it may also help resolve problems arising from *shari'a*-compliance, trans-jurisprudential consistency – including the growing issues around cryptocurrencies. The following sections of this article explore precisely how blockchain technology may enhance and benefit Islamic finance at both the micro level, and at the broader structural level.

A. *Verifying Shari'a Compliance*

For investors in Islamic financial markets, seeking *halal* investments (i.e. those investments that comply with *shari'a* requirements), and verifying the *shari'a*-compliant status of financial products or services is both time-consuming and can be confusing. The problem is essentially one of asymmetric information, transparency and information availability. Third party bodies play a crucial role as independent certifiers confirming the *halal* status of particular investments and financial arrangements. Among others, the most prominent Islamic finance standard setting bodies in the world include:

²³ Arner, Barberis & Buckley, *supra* note 3.

²⁴ See Wahad Invest: Online Halal Investment Platform, <<https://wahadinvest.com>> (last accessed 1 July 2020).

²⁵ Unlike in conventional banking, mortgages in Islamic banking are mainly financed through the mode of ‘Musharakah mutanaqisah’, which means ‘diminishing partnership’. For the comprehensive explanation and application of ‘diminishing partnership’ in practice, see Yahia Abdul-Rahman, *The Art of Islamic Banking and Finance: Tools and Technics for Community-Based Banking* (Hoboken, New Jersey: Wiley, 2014).

²⁶ For instance, home financing through ‘diminishing partnership’ agreement usually requires the application of complex mathematic formulas to calculate the amount of principal and rent to be paid to the financier over 15-25 years in a decreasing proportion. By using certain algorithms, financial technologies can simplify it and accomplish this process instantaneously.

- (a) Islamic Finance Services Board (IFSB)²⁷;
- (b) The Accounting and Auditing Organization for Islamic Finance institutions (AAOIFI)²⁸;
- (c) The City UK – Islamic Finance Sectoral Advisory Group, UK;²⁹
- (d) International Islamic Liquidity Management Corp, Malaysia;³⁰
- (e) International Islamic Financial Market, Bahrain;³¹
- (f) Australian Centre for Islamic Finance (AUSCIF), Australia;³²
- (g) International Islamic Fiqh Academy, Saudi Arabia.³³

Each one of these bodies has its own standards and requirements for the certification of financial products. With such disparate sources of rules, consistency and proof of compliance are issues that substantially limit the potential growth of Islamic finance. This is the pain point that blockchain can ameliorate.

One of the great benefits of distributed ledger technology (DLT) is its ability to drive disintermediation. That is, it can reduce or eliminate the role of transactional intermediaries thus directly linking the two main agents in an exchange. Information entered on a distributed ledger is, depending on the technical architecture of the database (permissioned or permission-less), tamperproof. This essentially means no single party may alter that data. The great benefit of this protection is that third parties may rely on that data without fear that anyone has maliciously manipulated the information.³⁴ This form of data retention also reduces the need to revert to certifying bodies for re-verification or authentication of *shari'a* compliance. For primary markets, a third-party certifier may still be required to confirm the initial status of an investment product. It is in the secondary market, however, that blockchain technology potentially unleashes immense value for the Islamic finance sector. Subsequent purchasers or subscribers to a financial product can rely, in full confidence, on the recorded halal certification entered and time-stamped on a distributed ledger without having to seek re-confirmation of the validity of paper-based or the electronic certificates. The cost and time savings alone can significantly enhance the efficiency of Islamic finance markets.

²⁷ <<https://www.ifsb.org/>> (last accessed on 16 February 2021)

²⁸ <<https://aaoifi.com/?lang=en>> (established in 1991 and based in Bahrain) (last accessed on 16 February 2021).

²⁹ <<https://www.thecityuk.com/about-us/our-committees-and-groups-2/islamic-finance/>> (last accessed on 16 February 2021).

³⁰ <<https://iilm.com/>> (last accessed on 16 February 2021).

³¹ <<https://www.iifm.net/>> (last accessed on 16 February 2021).

³² <<https://www.auscif.com/home>> (last accessed on 16 February 2021).

³³ <<https://www.iifa-aifi.org/en>> (last accessed on 16 February 2021).

³⁴ “The fundamental innovation of blockchain is that it creates a means of establishing and maintaining consensus among the participants in a transaction without the need for either an established trust relationship or a central intermediary.” Reade Ryan, Mayme Donohue, *Securities on Blockchain* 73 *The Business Lawyer* 85 (2017-2018). See further, Jon Truby, *Decarbonizing Bitcoin: Law and Policy Choices for Reducing the Energy Consumption of Blockchain Technologies and Digital Currencies* 44 *Energy Research and Social Science* 399 (2018).

B. *Compliance Fragmentation*

Certification, or approvals, are central aspects of Islamic finance markets. The ability to rely upon digital certifications that are cryptographically secure and verifiable solves one of the critical bottlenecks of the sector. The attributes of blockchain technology provide plausible solutions to this certification problem. Even so, there remains the real issue of compliance fragmentation that pertain to standards applicable to specific financial products and arrangements. Even if blockchain can significantly ease frictions in financial transactions in the Islamic finance sector, there remains the additional fundamental problem of differing *shari'a* compliance standards. The fragmentation of Islamic finance compliance is one of the great hindrances preventing stronger proliferation of Islamic finance globally.

One of the factors that is affecting the growth of Islamic finance is the way in which competing schools of jurisprudential thought (*Madahib*) approve and justify the legal principles that determine whether certain transactions or financial products are permitted or forbidden.

C. *Understanding the Role of Madahib*

There are many different schools of jurisprudential (*fiqh*) thought within the body of *shari'a* law. These differing perspectives and schools of thought are known as '*Madahib*'. The main *Madahib* in Sunni Islam are the *Hanafi*, *Hanbali*, *Malki* and *Shafi'i* schools. In *Shia* Islam, other schools of thought exist such as – *Ismaili*, *Jafari* and *Zaidi*. These schools of thought place different emphasis on different sources. The primary source of Islamic law is always the holy Quran. It is with respect to the secondary sources that most differences emerge. The secondary sources in *shari'a* law include the *Hadiths* and *Sunna*. These are the sayings of the Prophet (peace be upon him) and records of his life as documented by contemporaries. The various schools of thought in Islam differ mainly with respect to how much credence and what priority is given to various sources. Different emphasis on different sources may indeed result in conflicting interpretations of how behaviour or beliefs are treated.

In Islam everything is permissible except that which is explicitly forbidden. Classifications of conduct or beliefs fall into one of five categories:

1. Required (*Wajeb*) (i.e. Prayer)³⁵
2. Recommended (*Mustahab*) (i.e. extra prayer, charity)
3. Permitted (*halal*) (everything except that which is explicitly forbidden)
4. Discouraged (*Mukrooh*) (i.e. divorce)
5. Prohibited (*Haram*) (i.e. Consuming Alcohol)

³⁵ It should be noted that unlike other *madahib* the Hanafis differentiate between 'fard' and 'wajib'. In their view, 'fard' is that which is proven to be obligatory on the basis of definitive evidence. Whereas 'wajib' is proven to be obligatory on the basis of ambiguous evidence which is subject to interpretation. For detailed explanation, see Hyder Gulam, *Comparing the Legal Rules in the Maliki and Shafii Schools with the Hanafi School of Thought* 16 (1) *Jurnal Ilmiah Islam Futura* 1 (2016).

Unlike Catholicism, for example, Islam does not have a strict religious hierarchy whereby pronouncements and canon can be issued from upon high. In Islam, recognised religious leaders (Imams) within a given religious community issue religious edicts upon certain issues of uncertainty or controversy. Islam is of course also divided between the *Sunni* and *Shite* sects. The main challenge this religious structure poses, therefore, is that there is no one single *Fatwa*-issuing body. In theory, and indeed in common practice, any religious cleric, can issue a *Fatwa* on any religious question posed to them. This does not auger well for inter-jurisdictional transactions and could give rise to so-called '*Fatwa*-shopping'³⁶ whereby those desiring a particular outcome search to find a sympathetic cleric willing to support their perspective. This framework raises several issues. Beyond merely authenticating *Fatwa*'s, there are also the problems of reconciling contradictory *Fatwa*'s, challenging and seeking the updating of existing *Fatwa*'s and generally navigating the various trans-national schools of jurisprudential thought. As discussed below, discourse on standardizing the *Fatwa* system continues.³⁷

Shari'a law already requires that adherents give certain pronouncements greater weight and respect when there is a consensus among all eminent *shari'a* jurists on an issue at one single point in time. This consensus is referred to as '*Ijma*'. Eminent *shari'a* jurists are known as '*Uluma*', and their opinions on difficult questions are not merely opinions guided by intellectual calculation; rather they are conclusions based on personal reflection, and indeed a personal struggle with the requirements of their faith. This struggle is known as '*jihad*'. The process of reasoning by the *Uluma* is known as '*Ijti'had*'.³⁸

In the modern world where Islam exists in nearly all corners of the world, there is great difficulty in determining, who is to be classified as an eminent scholar, let alone whether all such scholars agree on a single question. Some have even argued that this means '*the gates of Ijti'had are closed*'³⁹ meaning that further innovations in *shari'a* are no longer possible.

As inconceivable as it may ostensibly appear, it is within these religious dynamics that we are to understand blockchain-related Islamic finance innovations. The core issues can therefore be summarised as follows:

³⁶ See Umar A. Oseni, *Fatwā Shopping and Trust: Towards Effective Consumer Protection Regulations in Islamic Finance* 12 (3) *Society and Business Review* 340 (2017). See also Jeremy Harding, *Fatwa Shopping* (8 December 2009) *London Review of Books*. Available at: <<https://www.lrb.co.uk/blog/2009/december/fatwa-shopping>> (last accessed 26 May 2019).

³⁷ Ghazala Ghalid Khan and Atiq-Uz-Zafar, *Fatwa Institution and Product Development for Islamic Finance* 16(2) *Policy Perspectives* 107 (2019); See also, Abdul Rafay, Ramla Sadiq, Mobeen Ajmal, *Uniform Framework for Sukuk al-Ijarah – A Proposed Model for All Madhahib* 8(4) *Journal of Islamic Accounting and Business Research* 420 (2017).

³⁸ See Nidal Al Sayyed, *Shari'ah Board, The Task of Fatwa, and Ijtihad in Islamic Economics, and Finance* (2009), <https://mpr.ub.uni-muenchen.de/20204/1/Sharia_Oeah_Board_The_Task_of_Fatwa_and_Ijtihad_in_Islamic_Economics_and_Finance.pdf> (last accessed 20 April 2020).

³⁹ See Wael B. Hallaq, *Was the Gate of Ijtihad Closed?* 16 (1) *International Journal of Middle East Studies* 3 (1984).

1. Different substantive scholarly interpretations pertaining to the halal nature of Islamic financial instruments exist;
2. The interpretive processes underlying the issuing of *Fatwa*'s are unclear and not uniform across *madahib*;
3. There is no official central mechanism for the harmonization of *shari'a* standards across *madahib*.

In response to these challenges, modern scholars of the Islamic faith across law, finance and theology are moving towards a discourse of standardization or codification of rules emanating from the various *madahib*.⁴⁰ The codification of *shari'a* law has a long history stretching back to the Ottomans.⁴¹ Interestingly, market forces and a growing popular interest in Islamic finance are influencing this contemporary standardisation and codification trend. Technology, specifically blockchain technology, may offer the means for its ultimate realisation.

D. *Disintermediation and Defragmentation*

In his recent work, Jonathon Ercanbrack argues that rule-making in the context of Islamic finance is moving away from traditional jurisprudential clerical pronouncements (known as '*usul al fiqh*') to a more standardised and, as noted above, legalist approach.⁴² Standardization, however, is more than merely a technical adjustment. There are deep religious considerations at play. In this regard, there are certain practices in Islamic jurisprudence that have the effect of creating the multiplicity of opinions and take away the efforts of standardization. These strategies are *Takhayyur* and *Tafliq*.⁴³ The *Takhayyur* is practiced by those who do not feel bound to any *madhab* and shop for a 'convenient' opinion from the teachings of different *madhahib* to attain their desired outcomes.⁴⁴ While *Tafliq* is practiced to legitimize opinions that are considered unlawful in one or more *madhab*. It involves the formation of a new opinion through combining a less known opinion with another.⁴⁵ Thus, it is imperative that Islamic financial institutions ensure that such practices are curtailed to sustain the spirit of Islam, consistency and financial certainty.

⁴⁰ See Anver Emon, *Codification and Islamic Law: The Ideology Behind a Tragic Narrative* 8 Middle East Law and Governance 275 (2016).

⁴¹ Al Majallah Al Ahkam Al Adaliyyah was a civil code of Ottoman Empire. It was codified based on Shariah Law from 1869 to 1876 and entered into force in 1877. Available at: <https://www.iiu.edu.my/deed/lawbase/al_majalle/index.html> (last accessed on 9 February 2021).

⁴² Jonathan Ercanbrack, *The Standardization of Islamic Financial Law: Lawmaking in Modern Financial Markets* 67 (4) The American Journal of Comparative Law 825 (2020).

⁴³ Abdul Rafay, Ramla Sadiq, and Muhammad Ajmal, *Fragmentation of Islamic Financial Products—An Exploratory Study of Islamic Schools of Thought*, Special Issue, Abasyn Journal of Social Sciences 48 (2016).

⁴⁴ *Ibid.* It is considered to happen due to peoples' following their *nafs* (desires) which is unacceptable in Islam.

⁴⁵ *Ibid.*

Blockchain may not be able to overcome the substantive elements of a broader Islamic jurisprudential harmonisation, although the technology may facilitate the ‘portability’ of religious edicts such that market entry may be facilitated by creating a greater level of certainty around the sector. Blockchain technology, and the capacity of the distributed ledger to capture and securely maintain information, has the potential to record the characteristics of a financial arrangement from its inception. Blockchain records will thus capture Islamic financial products allowing for a static comparison across *madahib* and a greater possibility of harmonisation given the greater certainty of subject matter.

From the perspective of the service provider, blockchain technology also holds the potential for opening up Islamic financial markets for financial players who are not, and have never been, in the field of Islamic finance. For blockchain to facilitate such market entry, a distributed ledger would ideally contain all the requirements established by a *fatwa* that constitute *shari’a* compliance for a financial product (for example, digital currencies ought to have a central authority in control at all times). Once those standards are confirmed and recorded upon the digital ledger for all to see and scrutinize, the verification of an Islamic financial product against those standards may be used as a license in other jurisdictions where *shari’a* compliance is required. Blockchain has already proven itself capable of applying given rules to effectively facilitating other types of transactions outside of Islamic finance.

With all the promise of automation, digitisation and outsourcing, Islam remains rooted in humanity. As technological limits are pushed further and further, it may become more and more apparent that there is an irreducible human element at play. A checkbox system, no matter how evolutionary and self-improving, may not satisfy that core element of *Qiyas* (measurement) necessary when comparing an innovation to the principles of *shari’a*.⁴⁶ As powerful as computers and artificial intelligence (AI)⁴⁷ may become, emulating the internal spiritual struggle (*Ijtihad*) of a cleric in reaching a *fatwa* is perhaps ultimately beyond computational systemisation. Technology, however, can still facilitate the process supporting that religious determination and its authentic dissemination.

As noted above, the process of confirming the *shari’a*-compliance status of a product or innovation currently involves clerical examination of the subject matter by a religious scholar and the issuing of a religious edict known as a *Fatwa*. Should DLT infrastructure strengthen the transactional side of Islamic finance markets, the pressure to harmonise substantive elements of *shari’a* compliance may well grow and eventually be realised. This unification, however, may not necessarily emerge through religious consensus but rather through commercial impetus and market forces.

⁴⁶ See ‘Qiyas’, *Oxford Islamic Studies*, <<http://www.oxfordislamicstudies.com/article/opr/t125/e1936>> (last accessed 26 May 2019). Defined as the process of analogical legal reasoning on matters not clearly covered by the holy *Quran*.

⁴⁷ Jon Truby, Rafael Brown & Andrew Dahdal, *Banking on AI: Mandating a Proactive Approach to AI Regulation in the Financial Sector* 14 *Law and Financial Markets Review* 110 (2020).

IV. Ancillary Benefits of Blockchain to Islamic Finance

Blockchain in the Islamic finance context can have many applications and spur unique innovations such as, for example, in the context of cryptocurrencies as discussed further below. Technology use in this space can also support the humanitarian ends desired by *shari'a* law in many ways, especially by enhancing financial inclusion. These ‘ancillary benefits’ emerging from DLT and the FinTech revolution are explored below.

A. Cryptocurrencies

In recent years, the hype surrounding cryptocurrencies has mainly focussed upon Bitcoin. Bitcoin, however, is only one of a number of alternative digital currencies sometimes referred to as ‘alt-coins’. States across the Muslim world have dealt with cryptocurrencies in different ways.

The leading interpretation of digital currencies with respect to Islamic finance can be found in the edict issued by the Grand Mufti of Egypt.⁴⁸ In early 2018, it was reported that Sheikh Shawki Allam sought to validate Bitcoin’s compliance with *shari'a* law and reached the position that *Bitcoin did not comply with the principles of shari'a*. Sheikh Allam determined that Islam prohibited Bitcoin because of a lack of monitoring by a central authority. This, he considered, ‘causes harm to individuals, groups and institutions’.⁴⁹ With a central tenant of Islamic finance being that one party to an investment ought not solely take on excessive risk, the excessive unilateral risks associated with bitcoin (and its booms of 2017 and 2021) increase the pressure on a broad Islamic prohibition on Bitcoin. The booms and busts of the Bitcoin price in recent years may have indeed justified and borne out that concern. The determination of Sheikh Allam provides little if any indication as to whether other digital currencies more broadly are also forbidden. Based on this reasoning, however, virtually all digital currencies that lack a central controlling authority would be prohibited. With decentralisation being one of the main selling points of these alternative currencies, this line of reasoning is potentially fatal to the growth of cryptocurrencies within the realm of Islamic Finance.⁵⁰

Some digital currencies however are guaranteed by non-digital securities. The digital currency ‘Tether’, for example, was founded on the basis of being guaranteed and backed by the US dollar. The principle is that there would be one dollar banked for every Tether created. At the time of writing, the digital currency was however

⁴⁸ BBC, *Egypt’s Grand Mufti Endorses Bitcoin Trading Ban* (2 January 2018). Available at: <<https://www.bbc.com/news/world-middle-east-42541270>> (last accessed 16 February 2019).

⁴⁹ *Al Ahram Newspaper, The Grand Mufti of Egypt: Dealing with the Currency “Bitcoin” is not Permissible in Sharia* (1 January 2018). Available at: <<http://gate.ahram.org.eg/News/1764841.aspx>> (Arabic) (last accessed 16 February 2019).

⁵⁰ For a cryptocurrency to be Sharia compliant, therefore, it ought to be regulated by a government or other trusted central authority. That authority should be mandated with protecting investors as well as society at large.

being investigated for potentially being fraudulent.⁵¹ An investigation by New York's Attorney General found that Tether had made false claims about its backing, and "held no reserves to back Tethers in circulation at the rate of one dollar for every Tether".⁵² The Tether episode may actually support the need for central authority oversight, especially since 55% of all Bitcoin purchases are conducted with Tether.⁵³ Regulatory oversight is increasingly occurring, at least in the US, following its classification of digital currencies as securities.⁵⁴ Nevertheless, in principle this version of fiat-backed currencies may prove to be an effective means of risk-sharing capable of satisfying the requirements outlined in Sheik Allam's edict.

A successful example of a *shari'a* compliant digital currency is claimed to be 'OneGram'.⁵⁵ OneGram was awarded the best Islamic Fintech product of 2018 at the Global Islamic Finance awards.⁵⁶ This particular digital currency, operating out of the UAE, has the dual advantages of being backed by gold (one gram for each initial coin offered, providing a resilient base price) and a partnership with GoldGuard, which is licensed with the Dubai Airport Free Zone. This provides both governmental oversight⁵⁷ and joint risk through the linking of the digital currency to the real asset price of gold. Since Islamic finance also requires wealth sharing, OneGram states its intention to give 2.5% of its profits to a charity registered in the UK, which is in its own name (potentially leading to a conflict).⁵⁸ It uses official auditors (PwC) and *shari'a* law advisors (*Al Maali*) to verify the legitimacy of the product. This oversight has added confidence to OneGram as well as the fact that users are required to buy one gram of gold in advance to using OneGram. That physical metal is deposited in the Dubai Airport Free Zone.⁵⁹ It should be emphasized that the success of OneGram as compared to other digital currencies could be explained by its conformity with the principles of Islamic finance. The most important characteristic of Islamic financing is that it is an asset-backed financing. Unlike in conventional

⁵¹ The investigation has determined that the operators of the Bitfinex trading platform, who also control Tether virtual currency, have engaged in a cover-up to hide the apparent loss of \$850m of co-mingled client and corporate funds. Most recently, the investigation itself has suffered a delay for the second time. See Eva Szalay, *New York's Investigation of Cryptocurrency Tether Hits Fresh Delay* (The Financial Times, 20 January 2021).

⁵² *Attorney General James Ends Virtual Currency Trading Platform Bitfinex's Illegal Activities in New York*, (23 February 2021), <<https://ag.ny.gov/press-release/2021/attorney-general-james-ends-virtual-currency-trading-platform-bitfinexs-illegal>> (last accessed 8 March 2021).

⁵³ *Bitfinex Settles New York Probe Into Tether, Hiding Losses* (Bloomberg, 23 February 2021) <<https://www.bloomberg.com/news/articles/2021-02-23/crypto-exchange-bitfinex-settles-with-new-york-to-end-probe>> (last accessed 8 March 2021).

⁵⁴ *US Lawmaker Introduces Bill Classifying Stablecoins as Securities* (Coindesk, 22 October 2019), <<https://www.coindesk.com/us-lawmaker-introduces-bill-classifying-stablecoins-as-securities>> (last accessed 20 April 2020).

⁵⁵ For detailed information on "OneGram" visit <<https://onegram.org/>>.

⁵⁶ <<https://onegram.org/onegram-accredited-as-best-islamic-fintech-product-initiative-in-2018>>.

⁵⁷ <<https://goldguard.com/security>> (last accessed on 15 February 2021).

⁵⁸ The 2.5% of the profit represents the amount of mandatory charity (zakat) that must be paid by Muslims whose wealth meet the necessary criteria.

⁵⁹ <<https://www.dafz.ae/en/>> (last accessed on 15 February 2021).

financing where money is recognized as a subject matter of trade, money has no intrinsic utility in Islam and is used only as a medium of exchange and a store of value.⁶⁰ Whereas gold has an intrinsic value and is considered an important shariah-compliant asset. Thus, *shari'a* rules require that financing must always be based on assets which have intrinsic value creating real assets and inventories.⁶¹

Despite the arrangements of firms such as OneGram, the reality remains that there is no central authority for gold and the price is volatile. Applying the same reasoning as the Grand Mufti of Egypt does not explain why gold is considered permissible and Bitcoin is not, Gallarotti explains that gold became the foundation of currencies merely because of its unilateral acceptance as a standard by industrialised nations.⁶² Furthermore, in the pre-war era there was little government control of money in national economies⁶³ and especially in the Islamic world⁶⁴, meaning this requirement for a centralised authority is a novel interpretation.

Other aspects gleaned from the reasoning by the Grand Mufti indicate a deep lack of understanding of digital currencies. One rationale given was that digital currencies have no fixed rules which means they are a 'void contract'. The rules however are formulated by the computer code underpinning the currency, and, similarly to fiat currencies, depend upon public acceptance and confidence. There will be confidence in a digital currency if the protocols supporting it remain unaltered.⁶⁵ There is always, however, the potential that a digital currency could be altered in a similar way that central banks can devalue their currencies by printing more notes. With Bitcoin for example, the protocols are not possible to amended unless a majority of users vote to change the protocol; this algorithmic method provides a very high degree of certainty of the continuation and infallibility of the rules. The reason given by the Grand Mufti would mean that fiat currencies are not valid either, so there is a hypocrisy at worst or misunderstanding at best.⁶⁶ Indeed, Bitcoin has gained traction in 2020-2021 partly due to its fixed rules and finite supply, differing from the potentially

⁶⁰ Therefore, making profit from selling money like in conventional loans is prohibited in Islam and is considered as 'riba'.

⁶¹ Muhammad Taqi Usmani, *An Introduction to Islamic Finance*, 12 (Hague: Kluwer Law International, 2002).

⁶² Giulio M. Gallarotti, *The Anatomy of an International Monetary Regime: The Classical Gold Standard, 1880-1914* (Oxford: Oxford University Press, 1995).

⁶³ See Robert Skidelsky, *Money and Government: A Challenge to Mainstream Economics* (London: Penguin, 2018).

⁶⁴ Hasan Zubair, *Money Creation and Control from Islamic Perspective* 15 (1) Review of Islamic Economics 93 (2011).

⁶⁵ Altering the protocols of a digital currency (such as the upper limit of available digital currency – with BitCoin that limit is 21 million) will create what referred to in cryptocurrency parlance as a 'fork'. The emergence of a new currency framework, such as Bitcoin cash, is a result of such a fork with the 'legacy' currency remaining to operate under the old protocol.

⁶⁶ Harris Irfan, *Cryptocurrency and the Future of the Islamic Economy* (29 March 2019), <<https://islamicmarkets.com/articles/cryptocurrency-and-the-future-of-the-islamic-economy-1>>. (last accessed on 16 February 2021).

inflationary tendencies of fiat currencies during that period when major economies have introduced quantitative easing through fiscal stimulus programmes.

Islamic finance banker Harris Irfan explains that some of those Islamic scholars banning digital currencies

...have failed to make the link between the soundness of gold and that of Bitcoin: both are inflation proof, decentralised, divisible, scarce and finite. Bitcoin has several additional qualities that gold doesn't have, like utility as a currency (exponentially improving all the time), anonymity, speed of transfer, non-counterfeitable through the genius of the distributed ledger, more resistant to theft (if stored correctly), open source and durable.⁶⁷

As seen with the success of OneGram, the lack of clerical support and guidance has not halted Islamic FinTech innovations. Indeed, the Islamic Finance community has acknowledged and supported the growth of OneGram with religious edicts being respected and acknowledged as an influencing force rather than an immovable obstacle. Furthermore, there are financial inclusion advantages of providing access to halal financial services as detailed below.

B. Financial Inclusion

A further advantage of *shari'a* compliant financial technology is its potential to enable access to finance to the vast populations of unbanked Muslims, particularly in the developing world. Rapidly growing usage of mobile technology in the developing world is already helping more people without banking facilities to operate mobile banking facilities. The deployment of mobile technologies by Islamic banks could reach the tens of millions of Muslims in markets such as Bangladesh and Pakistan. The digital infrastructure could also facilitate micro-lending and other innovations that can help lift many of these people out of poverty.

Eight of the UN's 2030 Sustainable Development Goals (SDGs) focus upon financial inclusion as a tool to achieve the goals, such as a means of ending poverty (SDG1), promoting economic growth (SDG8), economically empowering women (SDG5), facilitating sustainable agriculture (SDG2) and ending inequality (SDG10).⁶⁸ Worldwide, Muslims have a lower rate of financial inclusion than non-Muslims, and it is estimated that in Muslim-majority nations, 72% of people do not utilise any type of financial services.⁶⁹ This hinders the possibility of achieving SDGs in Muslim majority states, and the problem is heightened in the developing world. One reason for this may be that Muslims live in jurisdictions where they are unable to access halal

⁶⁷ *Ibid.*

⁶⁸ *Financial Inclusion and the SDGs*, <<https://www.unCDF.org/financial-inclusion-and-the-sdgs>> (last accessed April 20, 2020).

⁶⁹ Ramla Sadiq & Afia Mushtaq, *The Role of Islamic Finance in Sustainable Development* 5 (1) *Journal of Islamic Thought and Civilization* 50 (2015).

financial services.⁷⁰ A survey found the main barriers to entry for Muslims to financial inclusion included distance, cost, and documentation.⁷¹ Financial technology can help overcome financial exclusion generally, and in this case the ease of being able to access halal financial services, simplified through digital technology, would open up access and thus create financial inclusion. Furthermore, Muslims in the developing world may be unable to travel to any kind of traditional bank or have access to a computer to do their banking, but financial technology can again make it extremely simple and cost-effective to access halal financial services and products through a mobile phone.⁷² If access to Islamic finance on its own does not increase financial inclusion, as research by Demirgüç-Kunt, Klapper, and Randall suggests,⁷³ the increased ease of, and access to, banking using financial technology would help improve rates of financial inclusion. McKinsey Global Institute estimate that emerging economies' GDP could grow by \$3.7 trillion within ten years through digital finance.⁷⁴ A simplified financial technology model can be adopted in order to both exploit this growth opportunity and help achieve the SDGs.⁷⁵

C. *Building Confidence and Overcoming Inefficiencies in Islamic Finance*

It is seven years since the UK launched its 'UK Excellence in Islamic Finance' report, became the first Western nation to issue sovereign Sukuk,⁷⁶ and hosted the World Islamic Economic Forum.⁷⁷ Although there were grand ambitions for the growth of Islamic finance, scholars have argued the potential⁷⁸ has not been unlocked due to inefficiencies in the way Islamic banks operate and means by which transactions take place.⁷⁹ Kuran argues that Islamic finance 'opts for lower financial efficiency as the

⁷⁰ *Ibid.*

⁷¹ Asli Demirgüç-Kunt, Leora Klapper & Douglas Randall, *Islamic Finance and Financial Inclusion: Measuring Use of and Demand for Formal Financial Services among Muslim Adults* 6642 World Bank Policy Research Working Paper 4 (2013). [Hereinafter Demirgüç-Kunt, Klapper, and Randall].

⁷² *Ibid.*

⁷³ Demirgüç-Kunt, Klapper, and Randall, *supra* note 71.

⁷⁴ <<https://www.mckinsey.com/featured-insights/employment-and-growth/how-digital-finance-could-boost-growth-in-emerging-economies>> (last accessed on 16 February 2021).

⁷⁵ Jon Truby, *Financing and Self-financing of SDGs through Financial Technology, Legal and Fiscal Tools in Sustainable Development: Harnessing Business to Achieve the SDGs through Financing, Technology and Innovation*, 205 (Cornwall: Wiley: 2019).

⁷⁶ UK's sovereign sukuk used the Al-Ijara structure that involves rental payments on property generating income for investors. The profit rate on the sukuk was set at 2.036% in line with the yield on gilts of similar maturity. Recently in the UAE, a new fintech called Wethaq Capital Markets piloted the first Blockchain based sukuk under the supervision of the Dubai Financial Services Authority (DFSA): *Islamic FinTech in the Arab Region: Imperatives, Challenges and the Way Forward* (No. 173/2021) Arab Regional FinTech Working Group, 16.

⁷⁷ UKTI, *UK Excellence in Islamic Finance*, <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/367154/UKTI_UK_Excellence_in_Islamic_Finance_Reprint_2014_Spread.pdf> (last accessed 21 April 2020).

⁷⁸ Karim Ginena & Jon Truby, *Deutsche Bank and the Use of Promises in Islamic Finance Contracts* 7(4) *Virginia Law & Business Review* 620 (2013).

⁷⁹ Mahmoud A. El-Gamal, *Incoherence of Contract-Based Islamic Financial Jurisprudence in the Age of Financial Engineering* 25 (4) *Wisconsin International Law Journal* 605 (2008); Mahmoud A.

price of differentiating itself as “Islamic”⁸⁰. Slow compliance checking, slow collection of documentation and burdensome requirements to prove *shari’a* validity and ensure risks have been mitigated, combined with a labor-intensive, manual approach to completing paperwork all combine to turn many consumers off getting involved in Islamic finance transactions. Financial technology offers the ability to improve efficiencies and reduce costs in Islamic finance. As noted by S&P’s Islamic Finance Outlook 2021 Edition, “[h]igher digitization and fintech collaboration could help strengthen the resilience of the industry in a more volatile environment and open new avenues for growth”.⁸¹

Consumers of Islamic finance products need to be certain of risks involved – including so-called ‘haram-risk’ (i.e. the risk that a product is not *shari’a* compliant). Irfan criticizes the focus of bankers complying with the letter rather than the spirit of the law in order to push sales of financial products.⁸² The differences in religious interpretations leads to a lack of confidence in the products and raises such certainty risks. Furthermore, Kuran argues that “in complicating financial transactions deliberately, Islamic finance opens itself to money laundering and financial fraud.”⁸³ Such reputational risks hinder the progress of Islamic finance.⁸⁴

Standardised regulations respecting the spirit of the law, made more efficient and accessible through financial technology platforms, could make Islamic finance more readily utilised by a wider market. Citing a default on a sukuk by Dana Gas allegedly due to non-compliance with *shari’a* rules, S&P has called for “standardization of legal documentation and *shari’a* interpretation” to “restore the appeal”.⁸⁵ Standardisation would also be highly advantageous to facilitate the design of regulatory technology that could automatically ensure the validity of a product or transaction. Such regulatory technology could additionally be utilised to detect and minimise the risk of money laundering or illicit transactions.

As noted above, where there is greatest potential upside is the validation of products, companies and transaction types through a distributed ledger where such instruments and investments are vetted before being on-boarded. Once on the ledger the information is immutable, tamper proof and easily accessible. An investor or financial product provider in Malaysia could transact with an Egyptian counterparty with the Islamic finance mechanism being validated through the blockchain. This all assumes, however, substantive uniformity in the *shari’a* rules applicable.

El-Gamal, *Islamic Finance: Law, Economics, and Practice* (New York: Cambridge University Press, 2006).

⁸⁰ Timur Kuran, *Islam and Economic Performance: Historical and Contemporary Links* 56 (4) *Journal of Economic Literature* 1292 (2008). [Hereinafter Kuran].

⁸¹ S&P Global Ratings, *Islamic Finance Outlook* (2021 edition), [hereinafter *Islamic Finance Outlook 2021*], available at: <<https://www.spglobal.com/assets/documents/ratings/research/islamic-finance-book-2021-edition.pdf>> (last accessed 14 February 2021).

⁸² Harris Irfan, *Heaven’s Bankers: Inside the Hidden World of Islamic Finance* (New York: The Overlook Press, 2015).

⁸³ Kuran, *supra* note 80.

⁸⁴ Abul Hassan & Sabur Mollah, *Risk Management in Islamic Financial Institutions*, in *Islamic Finance*, 223 (Cham: Palgrave Macmillan, 2018).

⁸⁵ *Islamic Finance Outlook 2021*, *supra* note 81.

D. *Technology Facilitating Legal Redress*

One may conceive of *shari'a* compliance as a contractual undertaking by a service provider committing that they will conduct their business and structure their transactions in such a manner that will not transgress *shari'a* rules. In most developed financial jurisdictions, representations that are manifestly false, misleading or intended to confuse are legally actionable. In such disputes, the certainty of Islamic financial products and arrangements entered on DLT databases will also aid in an evidentiary sense when consumers are seeking legal redress through secular courts. Where commercial counterparts deviate from *shari'a* arrangements, DLT entries provide an immutable record of party intentions and transaction-related activities.⁸⁶ Blockchain is a time capsule of commercial arrangements and may well aid in any legal redress aggrieved parties may pursue.

V. Conclusion

Islamic finance is a significant and growing part of the global economy. The FinTech revolution of the past decade has influenced the manner in which innovations in Islamic finance are emerging. Although those innovations are mainly related to product delivery and user interface or experience, the nature of DLT has the potential to have deepened structural impacts on Islamic finance. DLT allows for greater portability of products and services by enhancing the level of data authenticity recorded on the blockchain. The reach of Islamic financial services are therefore potentially greatly increased through this technology. Digitization and blockchain can therefore support and ensure compliance of Islamic finance transactions, offering millions of people access to finance. This helps grow the industry, vastly improves efficiency of transactions and enhances financial inclusion.

What this technical innovation has highlighted, however, is the fragmented and ill-organised body of substantive jurisprudence standing as a significant bottleneck in the growth of Islamic finance sector. Beyond growing the size of the Islamic finance market, DLT can spur many ancillary benefits including in the context of cryptocurrencies financial inclusion, confidence building and supporting legal redress for *shari'a* non-compliance. Through the commercial pressures of a growing Islamic financial sector – jurisprudential harmonisation may well follow. If indeed FinTech innovations have this ultimate outcome, it will represent a unique case of material innovations influencing moral beliefs further underscoring the revolutionary nature of this wave of digital finance.

⁸⁶ Miranda Woods, *Chinese Court First to Use Blockchain Secured Evidence for Criminal Conviction*, Ledger Insights (4 November 2019), <<https://www.ledgerinsights.com/china-court-conviction-blockchain-secured-evidence/>> (last accessed 7 February 2021).