MUFTI FARAZ ADAM

INTRODUCTION TO ISLAMIC FINTECH

2ND EDITION

AMANAH ADVISORS PRESS

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Introduction to Islamic Fintech

By Mufti Faraz Adam

AMANAH ADVISORS PRESS

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"Your first digital footprint in the world of Islamic Fintech."

Preface

I begin with praising the Almighty Allah who has given me innumerable blessings, and I send *Salawat* and salutations to our beloved Messenger, the teacher of teachers, our Master Muhammad ﷺ.

In 2016, while pursuing my master's degree in Islamic Finance and Banking, cryptocurrencies, particularly Bitcoin, began to make headlines. The world was trying to understand the nature of this new development, but the Islamic Finance realm remained relatively quiet, with little investigation into the implications of this emerging technology from a Sharia compliance standpoint. I knew this *had* to be the subject of my thesis.

Since I had specialised in Islamic law and jurisprudence, researching something contemporary like cryptocurrencies was exactly what my training as an Islamic scholar and Mufti had prepared me for. The Fiqh training is all about researching and finding appropriate Sharia responses to puzzling questions and circumstances. I was fortunate to be in the right place, at the right time, and with the right idea – and this is solely Almighty Allah's command. There it was: in 2017, after several months of inquiry and research, I had authored a thesis on Bitcoin from a Sharia compliance perspective. In fact, I had simultaneously developed another research paper published online. To my surprise, it had been downloaded and read tens of thousands of times. From that moment until now, my focus on Islamic Fintech has only increased as new Islamic Fintech projects have continuously surfaced.

In a rapidly evolving world, the intersection of technology and finance has given birth to an innovative domain known as Fintech. The Islamic finance industry has not remained untouched by this revolution, leading to the emergence of Islamic Fintech. As an Islamic scholar and an avid follower of developments in the financial technology space, I felt a deep sense of responsibility to address the implications and potential of Islamic Fintech in the context of Sharia principles.

This book is a culmination of my efforts to bridge the gap between traditional Islamic finance and the ever-changing landscape of Fintech. While the core values of Islamic finance remain firmly rooted in Sharia principles, the rapid advancements in technology necessitate a continuous re-evaluation of our understanding and approach to this emerging field.
One of the most striking aspects of the modern world is the pace at which it moves. Developments in technology and finance can render knowledge and insights obsolete in a matter of months, if not weeks. As a result, the ideas and perspectives presented in this book, though current and relevant at the time of writing, may soon be overshadowed by newer innovations and breakthroughs. It is crucial for scholars, practitioners, and enthusiasts alike to remain vigilant and adaptive, embracing change while staying true to the principles of Sharia.

In this book, I have attempted to provide a comprehensive introduction to Islamic Fintech while acknowledging the dynamic nature of the field. I have endeavoured to present a foundation upon which readers can build their understanding and explore the ever-expanding world of Islamic Fintech. This work is aimed at individuals with varying levels of familiarity with finance and technology, offering insights and guidance for beginners and experts alike. As we continue to navigate the fascinating world of Islamic Fintech, it is my hope that this book will serve as a valuable resource and starting point for those seeking to understand the relationship between traditional Islamic finance principles and the innovative technologies reshaping the financial landscape. In the end, the goal is to empower readers to engage with Islamic Fintech in a manner that is both informed and in alignment with the ethical and moral foundations of Sharia.

Since the first edition of this book which was released in 2020, there have been far better and greater contributions on Islamic Fintech than this. I commend all the authors and pray that their works are accepted by Almighty Allah.

Mufti Faraz Adam
Leicester, United Kingdom
12th April 2023

Foreword – Harris Irfan

For more than five decades, the modern Islamic finance industry has come to rely on the legal opinions and certifications of a small group of Sharia scholars. They have typically worked as consultants for many of the world's leading financial services institutions, providing advice and opinions on the creation of new financial products that accord with the principles of Sharia. They have also sat on the Sharia boards of Islamic financial institutions, funds, and capital markets issuances, assuring the customer that the service being provided remains halal.

I have had the privilege of working with many of these scholars. For these individuals to be internationally renowned and sought after is no mean feat: their skill set must encompass, to a greater or lesser extent, the jurisprudence of commercial transactions (*fiqh al mu'amalat*), English law and other legal systems, complex financial instruments, economic theory, accounting and tax, commercial pragmatism, and good old common sense. It is not enough for them to be Sharia experts; they must also have a commercial understanding of the world of banking and finance, as well as the human psychology behind it.

However, there are too few of these venerable scholars. They are stretched thinly, sitting on dozens of Sharia boards at a time and often only because an institution seeks their association as a marketing tool to a select group of clients. There is, of course, nothing inherently wrong with this. Nonetheless, even these senior scholars recognise that unless a young and dynamic cadre of similarly-qualified scholars emerges in greater numbers, the Islamic finance industry risks stagnation.

In recent years, in my own consulting work I have tried to identify those individuals who have what it takes to work alongside - and one day take the place of - these eminent teachers. It isn't enough for these young scholars to merely certify the compliance of financial products. Just as their seniors had once conducted fundamental research and development in the industry, the next generation must move with the times, operating at the cutting edge of the evolution (and revolution) in financial services.

One scholar in particular has come to my attention: Mufti Faraz Adam. I was already familiar with his work with the National Zakat Foundation, but as my firm and his began to work together on client consulting mandates, I discovered something much more than a "community scholar". It was when I was preparing my own research on cryptocurrency in response to a diatribe of misinformed and misguided *fatawa* by non-specialist imams with huge social media followings that I discovered Mufti Faraz's paper on the subject. The paper was nuanced and thorough, revealing a deep understanding of the subject matter and an intellectual curiosity that allowed his thinking to evolve as he delved deeper into technical intricacies.

Mufti Faraz is working closely with the Islamic finance and Fintech industry; not just in performing the essential role of certification, but more importantly in "moving the needle". If the objective of Islamic finance is to implement an ethical, real economy-based alternative economic model for the benefit of humanity, then we must collectively move on from an emphasis on the traditional banking industry and towards a tech-based, democratised form of financial services. I hope this book will be an essential part of that process.

Harris Irfan
Chairman, UK Islamic Fintech Panel
8 October 2020

Foreword – Sultan Choudhury

Islamic Fintech is not an easy subject to understand as it combines two areas that have proven to be at least a little difficult to grasp separately, never mind together – that of Islamic Finance and the development of Fintech as a recent phenomenon in our busy lives. "Introduction to Islamic Fintech" by Mufti Faraz Adam lays the successful foundations for demystifying this topic.

I met Mufti Faraz through NZF (National Zakat Foundation), a charitable organisation of which I am a founding trustee. At the time I was CEO of the largest Islamic Bank in the UK – Al Rayan Bank (formerly Islamic Bank of Britain) – where I had been part of the founding management team. NZF had pioneered a fresh approach to Zakat (mandatory alms in Islam) in the UK for both payers and recipients by focusing on giving zakat locally. NZF had collaborated with the Bank and set up educational seminars for our customers in branches; that is where I met Mufti Faraz, who was presenting. Mufti Faraz had joined NZF to provide Sharia advice, undertake research, and deliver presentations to the public covering topics that included how Zakat should be applied to contemporary financial matters such as pensions, shares, real estate, etc.

At the Bank back in the late 2000s, we had decided and undertaken to go into "cloud" technology quite early relative to other banks. This is where you move away from software hosted onsite on our own servers to platforms that were hosted by large software companies around the world or in the "cloud". We had used this technology to help us enter the Islamic home finance market at markedly lower operational costs than could have been achieved with the legacy systems that our big bank competitors were using. We used that cloud-based system to launch our online savings accounts too. We had ultimately used technology as an enabler to create a dominant position in the niche UK Islamic finance market in which we operated.

Of course things have moved on significantly with cloud technology, mobile devices, mobile and fixed line data speeds, blockchain, artificial intelligence, machine learning, the Internet of Things, "Big Data", and social media to name some of the developments – and they have become pervasive in society, whether we realise it or not. This has led to phenomenal disruption in traditional financial services.

Taking the other fundamental conceptual area brought together in this book, Islamic Finance in a contemporary sense has been available for over 60 years and continues to develop. There is a long way to go and many product gaps exist in Islamic Finance in the UK at the time of writing, such as consumer finance and business finance. Fintech, through its ability to disrupt the traditional ways of doing business and the enabling of new ways to reach customers, has

the potential to accelerate developments in Islamic finance and fill these gaps. This is extremely exciting for a practitioner of Islamic Finance such as me and many others.

"An Introduction to Islamic Fintech" provides a valuable overview of the subject matter which is not easily available in one place today. It explains applications of Fintech today and how Islamic finance concepts relate to them. The book is a *tour de force* overview of the subject area and will allow the reader to delve deeper, if they should so desire. If the reader is interested in Islamic Finance, then there is plenty of material for them so they may understand this topic better. If the applications of Fintech interest them, then this fast-moving topic can be explored further through an increasing body of literature. No book, however, currently melds the two together to provide that overview understanding of both. For this reason, "Introduction to Islamic Fintech" provides an illuminating gateway into this field.

Since those days at NZF, who he still serves in a global capacity, Mufti Faraz has vigorously pursued the knowledge of contemporary finance and how it relates to Sharia and modern-day applications of Islamic Finance. An incredibly hardworking individual, his Master's Dissertation on such a contemporary topic as Islamic Fintech has made him one of the UK's authorities in this area. In fact, Mufti Faraz is the Sharia advisor for many leading Fintech and 'start up' Islamic Finance organisations. Islamic Fintech organisations, due to their originality, generally fall firmly in the 'start-up' or 'scale-up' segment of the enterprise lifecycle. As a result, Islamic Fintech is a very dynamic sector, ever-evolving and with many successes – and, unfortunately, failures too. I am sure that Mufti Faraz will regularly update this important book with new developments; his experiences with nascent organisations will provide an interesting discourse on how Islamic Fintech is applying Sharia-compliant contracts and instruments in new and innovative technological ways to further disrupt traditional methods of Islamic Finance and help complete its unfulfilled potential. I look forward to seeing Mufti Faraz write many future editions of "An Introduction to Islamic Fintech" Insha'Allah (by the Will of God)!

Sultan Choudhury OBE
4th October 2020

Foreword – Abdul Hasib Basit

Islamic finance is estimated to be worth $3.5 trillion in global assets by 2024[1], an impressive growth for an industry that will be only 50 years on from inception by that point.

Yet, as an industry that purports to be a conduit for trade and the underpinning of a vibrant real economy which in turn provides the opportunity for individual wealth creation, some concerns remain about Islamic finance's effectiveness in the Muslim world and beyond.

The World Bank estimates that Muslim majority countries[2] have a disproportionately higher level of unbanked population. Moreover, as compared to non-Muslim countries, up to triple the amount of unbanked individuals in some Muslim countries cite religious regions for not engaging with financial services. At the same time, these countries have a thriving Islamic finance industry. However, other than in Saudi Arabia, no country has more Islamic assets than conventional assets[3]. So, if Islamic finance is achieving its full potential, why are there so many unbanked people in the Muslim world; why does the Islamic finance industry not have a larger market share and why does its application not transcend the Muslim world?

In short, there is a gap between the potential of Islamic finance and what is practiced today. The gap has many facets; legacy thinking and complacency within banks, an unlinked financial and real economy, an Islamic finance industry trying too hard to replicate a conventional finance industry, a lack of consumer education on the benefits of products based on Islamic principles, limited and poor product development, and a lack of effective delivery to the end consumer.

To break this status quo that exists in the industry, Fintech presents the best opportunity for Islamic finance to address the causes of these gaps. In 2017, the first landscape of the Islamic Fintech industry[4] found that over a hundred Fintech companies identified as being based on Islamic principles. This number has steadily been on the rise and, most encouragingly, it is a global phenomenon.

How do we build from this foundation an Islamic Fintech industry that can better serve the Muslim consumer and beyond?

To do so requires a connected global ecosystem that enables innovation, returns to the first principles of Islamic finance, leverages technology advancements globally, advocates for a different form of finance to develop, reduces the barriers to adoption, and educates the consumer on the benefits. At the same time, it is important to tap into the global zeitgeist for more ethical forms of finance by demonstrating that Islamic finance has solutions to offer and a role to play in a more equitable financial system which can be delivered by Islamic Fintech companies.

The job of the innovator in this ecosystem is to continue to solve these gaps while they persist. Speaking to the founders of Islamic Fintech companies, as I do so often in my day-to-day work, some common factors exist; all of them have chosen to be entrepreneurs in this space because they want to build the financial products that they themselves want to use and perceive to be currently missing from or poorly delivered by banks. They all want to build financial products that serve the Muslim community better, use technology solutions to reach those that have been historically excluded, and demonstrate that the Islamic principles on which their solutions are built have mass market appeal as an ethical finance product.

I am delighted to write the foreword for such an important body of work that contributes so effectively to the knowledgebase in this growing ecosystem (I, too, received much of my grounding in Islamic finance from a similar introductory text).

Mufti Faraz Adam is uniquely qualified to address these topics as one of the foremost thinkers in the industry, possessing the ability to address the theological rationale, legal jurisprudence, and regulatory considerations in the Islamic Fintech industry. Moreover, he is an innovative practitioner putting his expertise to use in building the Islamic Fintech solutions of today, addressing all of the complex business considerations in launching and running a financial services and technology venture. His experience and expertise are well placed to introduce Islamic Fintech to readers and delve into the Sharia aspects pertaining to each business model and technology.

Inshallah, much like my early reading, this book inspires you as the reader to explore this industry further, become savvy consumers or the next generation of innovators driving the Islamic Fintech industry to reaching its true potential.

Abdul Haseeb Basit
Co-Founder & Principal at Elipses and Chairman at Yielders.

Foreword – Mufti Irshad Ahmad Aijaz

Current technological developments in almost all areas of life have multi-dimensional effects on society. Human societies are now facing many challenges including legal, ethical, social and behavioural issues. These changes have both positive and negative effects and experts of almost all fields of life are now facing concerns and queries from people who want to know everything about socio cultural, socio economic and other impacts of these developments. After emergence of Islamic financial thoughts and its practical experience, Muslims are exploring more about implications of new technological developments and how it is being studied in Sharia law. Many writers in the field of Sharia law are now doing good research and did a good job by giving good thoughts and research work on many topics. One of the topics related to Islamic finance is use of technology in finance and Islamic perspective on it. The financial technology or Fintech is now an important topic which requires a deep insight into its related various topics.

Our brother Mufti Faraz Adam is a young Sharia scholar who actively participates in the field of Islamic finance and has contributed with good academic writings on modern issues from Islamic perspective. His current work is on Islamic fintech which deals with use of technology in matters pertain to finance, wealth and money.

Although the topic of Islamic Fintech is new and still not mature but in my view this book is a great contribution from Mufti Faraz and he covered almost all major areas in this book. I think this book will help students, practitioners and researchers in understanding Islamic perspectives on use of technology in management of wealth and economic resources.

I pray Allah SWT to accept efforts of Mufti Faraz, give him Taufeeq for doing more, and to give him more knowledge and Taqwa. Aameen ya Rabbal A'lameen

Mufti Irshad Ahmad Aijaz,
Chairman Sharia Surpervisory Committee, State Bank of Pakistan

1St Rabee ul Awwal, 1442 AH
19 October, 2020

Introduction

The global financial landscape has undergone a significant transformation in recent years, fuelled by rapid technological advancements and growing consumer demands for innovative financial solutions. Fintech, a portmanteau of "financial technology," has emerged as a disruptive force, revolutionising the way individuals and businesses conduct transactions, manage investments, and access financial services. As fintech continues to gain momentum, the Islamic finance industry has begun to embrace this change, giving rise to a new phenomenon known as Islamic Fintech.

Islamic Fintech, at its core, seeks to harmonise the principles of Sharia with the innovative solutions provided by financial technology. This fusion creates a unique opportunity for the Islamic finance industry to reach new heights, expand its reach, and address the evolving needs of a diverse, global audience. "Introduction to Islamic Fintech" is designed to provide readers with a comprehensive understanding of this emerging field, exploring its foundations, key concepts, and potential applications.

The fascinating irony about fintech is that it's intertwined with our daily lives, yet we often don't even realize it! We regularly interact with and benefit from fintech as consumers and customers. Once we recognize our connection to fintech, it becomes much easier to grasp its significance.
Fintech is present when you use your phone for payments, check your bank balance, receive funds in a digital wallet, pay for a bus ticket with your smartwatch, or secure cheaper car insurance through a telematics box. You don't need to understand the technical aspects of a technology to reap its benefits. However, staying unaware of the evolving landscape in the information age can affect our lives and the opportunities we might miss due to a lack of knowledge.

Furthermore, fintech in the Islamic Finance realm introduces an additional layer of complexity. If mastering Islamic Finance is like scaling a mountain, then conquering Islamic Fintech is akin to traversing a treacherous mountain range with added technical know-how! This book aims to give you the gear and safety equipment for that mountain range.

The book is organised into several chapters, each covering a distinct aspect of Islamic Fintech. We begin with a primer on fintech, delving into its historical roots and its development. This foundation will serve as the basis for our exploration of Islamic Fintech.

Next, we will examine the various components of fintech and their applicability within the framework of Islamic Finance. This section will cover topics such as crypto-assets, blockchain technology, crowdfunding, and more. We will discuss the challenges and opportunities that

these technologies present for the Islamic Finance industry and how they can be leveraged to create innovative, Sharia-compliant solutions.

In the subsequent sections, we will delve deeper into the practical applications of Islamic Fintech, exploring real-world case studies and examples of how these technologies are being integrated into the Islamic finance ecosystem.

Finally, we will take a look at the future of Islamic Fintech, highlighting emerging trends and potential growth areas. This forward-looking perspective will provide readers with insights into the opportunities and challenges that lie ahead for the Islamic finance industry as it continues to embrace the transformative power of fintech.

"Introduction to Islamic Fintech" aims to serve as both an informative guide for those new to the subject and a valuable resource for seasoned professionals seeking to deepen their understanding of this rapidly evolving field. By exploring the intricate relationship between Islamic finance principles and cutting-edge financial technology, we hope to inspire readers to engage with Islamic Fintech in a way that fosters growth, innovation, and adherence to the ethical values that underpin the Islamic financial system.

Chapter 1: What is Islamic Fintech?

Introduction

Islamic Fintech is composed of two terms: "Islamic" and "Fintech". Before we can explain Islamic Fintech as a phenomenon, we must first break down these two terms to understand what they mean.

Defining Islamic

"Islamic" is an adjective from the noun "Islam" and suffix "ic". Islam is the universal system and order of commitment to Allah; it is a manifestation of submission to Almighty Allah in all facets of life. This is the very blueprint which every Prophet has encouraged mankind to adopt and conform to. It contains the living, societal, economic, spiritual, and psychological norms which bring out the most optimal results for all of humanity in the immediate and long-term.

When the adjective 'Islamic' is used, it generally denotes that the subsequent noun has an Islamic application and that it is distinct enough from an alternative practice or operational framework. Hence, when the word finance is used in an unrestricted sense and without any modifiers, it generally refers to conventional finance which incorporates various philosophies, ideas, and practices. When finance is modified by the adjective Islamic, it refers to a specific notion, idea, and worldview of the way finance is done.

Although some critique the notion of adding the adjective of 'Islamic' in front of various nouns, it does help in immediately identifying the class and category of whatever is being referred to thereafter. It provides context for discussions and allows the readers and listeners to acknowledge the paradigm that is being referred to and the framework of operations. At the same time, the misuse of this adjective can, at times, create a false dichotomy and a binary which can lead to an adverse outcome. The binary vision tends to lead people to conclude that something not preceded by 'Islamic' means that it is ultimately *unislamic*. This then leads to a false sense of piety and shunning of things which are absolutely permissible. In fact, it leads some to believe that anyone indulged in the 'other' is erroneous and wrong, or involved in the worldly (*dunya*) life and neglecting the Hereafter. For example, the dichotomy of education and Islamic education has prevailed in certain communities, which has led some to assert that anything not considered to be Islamic education is not rewarding and of little use. This cannot be further from the truth. After the knowledge of Sharia – which is the best of all knowledge and the most praiseworthy – Ibn Abi Hatim al-Razi reports how Imam al-Shafi'i (Rahimahullah) praised medical knowledge as the second best knowledge to learn after Sharia. In another report, Imam al-Shafi'i discouraged residing in a city where there is

an absence of a Mufti and a doctor. have stated how studying and practicing medicine is praiseworthy as it benefits people. Any study which is of benefit is praiseworthy.

In summary, the adjective 'Islamic', in our context, is used to refer to a specific paradigm which champions a specific worldview, philosophy, objectives, operations, and practices, making it wholly distinct from the conventional paradigm.

Defining Fintech

Fintech is a term that combines the words "financial" and "technology" and refers to the use of innovative technologies to provide or improve financial services. Fintech is a broad and dynamic field that encompasses various products, applications, processes, and business models that aim to make financial services more accessible, efficient, and customer-oriented. Some of the definitions on fintech include:

- According to Oxford Dictionaries, fintech means "computer programs and other technology used to support or enable banking and financial services."
- According to Merriam-Webster, fintech refers to "products and companies that employ newly developed digital and online technologies in the banking and financial services industries."
- According to Wikipedia, fintech is "a portmanteau of 'financial technology', [that] refers to firms using new technology to compete with traditional financial methods in the delivery of financial services."
- According to FinTech Weekly, fintech stands for "financial technology, which consists in the use of innovative technologies applied to the financial industry."
- According to Dictionary.com, fintech is "digital technological innovations utilised by customers or institutions in the financial services industry."

Some examples of fintech products and services include mobile banking, peer-to-peer lending, crowdfunding, robo-advisors, cryptocurrency, blockchain, artificial intelligence, biometrics, cloud computing, big data analytics, and more. Fintech has transformed various aspects of the financial sector such as payments, lending, investing, insurance, wealth management, capital markets, regulatory compliance, and cybersecurity. Fintech also enables financial inclusion and empowerment for millions of people around the world who lack access to traditional banking services[1].

To acquire a more wholesome understanding of the term Fintech, let's break the word down further. Fintech comprises two words: Finance and Technology. Finance is a broad term that encompasses various aspects of money and how it is used in different contexts. Finance can refer to the study of how individuals, businesses, and governments manage and allocate their financial resources. Finance can also refer to the activities and services related to money, such as banking, investing, lending, borrowing, saving, budgeting, accounting, auditing, and

taxation. Broadly, finance refers to the management of money and includes all activities involved with money, such as investments, lending, savings, borrowing, structuring, recording, forecasting, and more.

Technology is a word that we use very often in our daily lives, but what does it actually mean? The word technology comes from the Greek words "techne" and "logos", which mean "art" and "word" respectively. In ancient times, technology referred to any skill or craft that humans used to create something useful or beautiful. For example, pottery, weaving, carpentry, and metalworking were all considered technologies.

However, over time, the meaning of technology changed and expanded. As humans developed new ways of solving problems and improving their lives, they also created new kinds of technologies. For example, the invention of the printing press in the 15th century enabled mass production of books and spread of knowledge. The invention of the steam engine in the 18th century enabled industrialisation and transportation. The invention of the telephone in the 19th century enabled communication across long distances. The invention of the computer in the 20th century enabled computation and information processing.

Today, we often use the word technology to refer to digital stuff and latest innovations that involve electronics, software, biotechnology, nanotechnology, robotics, artificial intelligence, and so on. These are technologies that are based on scientific principles and use advanced materials and methods. They are also technologies that have a significant impact on society and culture, as they change the way we communicate, work, learn, entertain, and live.

So why do we use the same word for both ancient and modern technologies? One possible reason is that technology is not just a collection of tools or devices, but a way of thinking and doing. Technology is a human activity that involves creativity, problem-solving, experimentation, and adaptation. Technology is also a social phenomenon that involves collaboration, communication, regulation, and ethics. Technology is a dynamic process that evolves with human needs and wants.

Therefore, technology is not limited by time or place. It is a universal concept that applies to any human endeavour that involves making something better or easier. Whether it is a clay pot or a smartphone, a wheel or a rocket, a painting or a video game, technology is what humans do to shape their world.

Considering all of the above, fintech refers to activities of money management through enabling and empowering digital applications and processes. The above describes what fintech is - however, the term is commonly used to describe the platforms and companies which offer products or services through digital media via a highly innovative, disruptive, and pioneering approach.

The goal of Fintech is to enhance the delivery, accessibility, and efficiency of financial services while reducing costs and improving the customer experience. Fintech can help companies, business owners, and consumers better manage their financial operations, processes, and lives. Fintech has caused a change in the dynamics and ways people interact. In the context of businesses, it has added another dimension of business interaction and engagement. Fintech allows businesses to operate solely online; it allows the leveraging of cloud-based services as opposed to physically storing all data in each delivery point. This has created a new level of efficiency and accessibility of financial services. Many existing financial institutions are implementing Fintech solutions and technologies in order to improve and develop their services, as well as gaining a competitive advantage. Taking these additional angles regarding Fintech into consideration, some have described Fintech as "new applications, processes, products, or business models in the financial services industry, composed of one or more complementary financial services and provided as an end-to-end process via the Internet"[2].

To summarise all of the above, financial technology—fintech for short— describes the evolving intersection of financial services and technology. Thus, "Fintech" is simply a combination of the words "financial" and "technology". Fintech is focused on using technology to deliver financial services and products to consumers. These services and products can be from across the spectrum of finance, including banking, equity financing, debt financing, retail and institutional investments, insurance, investing, wealth management, savings, personal finance, and even charity. Anything that relates to finance has a potential place in the Fintech ecosystem. Although the term 'fintech' has only come to the fore in the last decade, it is not a new phenomenon. Technology has continuously improved finance throughout the centuries, which we will touch upon in the next chapter. However, what has made this decade of fintech exciting is the nexus of the internet, smartphones, and smart wear, which has rapidly changed the landscape of technology-driven finance. It has led to an acceleration in innovation, unlike previous times, and allowed developers to test unique ideas.

Understanding Islamic Fintech

Islamic Fintech is a further development of the Islamic Finance sector. Just like Islamic Finance refers to financing methods aligned with principles of Islam and a paradigm reflecting the values embedded in Islam, Islamic Fintech refers to the use of financial technologies with a modus operandi and worldview stemming from Islam. Etymologically, Islamic Fintech is the amalgamation of technology and Islamic Finance, which means that any product or service that spawns from fintech must abide by the Sharia principles in terms of ethos, vision, mission, form, structure, contracts, processes, marketing, delivery, and communications. Further, the adjective 'Islamic' defines the essence of the product or service; it belongs to a distinct worldview and philosophy. Hence, the practices and operations are structured and developed in a manner to realise those ideals and values engendered by this worldview and belief.

True to its fintech label, Islamic Fintech facilitates the digital distribution of Sharia-compliant financial products and services. Islamic Fintech platforms tend to adopt revolutionary technologies like Artificial Intelligence (AI), blockchain, big data, extensive cloud computing, and the Internet of Things (IoT) devices in providing Islamic financial services in a more sophisticated and transparent way. Its activities will involve deploying new tech-based business models to promote economic, environmental, financial, and social goals, including the betterment of all Islamic financial services, product performance, and broader benefits like financial inclusion, poverty alleviation, and social justice. Islamic Fintech is the delivery of Islamic Finance through emerging and enabling technology, is an extension of Islamic Finance[3]. Islamic Fintech has the ability to enable greater access to Islamic financial services with cost efficiency, thereby providing more opportunities for financing, payments, and investments aligned with Sharia objectives and principles.

Locating Islamic Fintech in the Islamic Economy

Where does Islamic Fintech fit in within the wider Islamic economic framework and sector? To locate Islamic Fintech, it is worthwhile mapping the entire Islamic economy. The Islamic economy is made of several sectors, such as:

- Halal food
- Halal travel and tourism
- Halal pharmaceuticals
- Halal cosmetics
- Islamic finance
- Halal media and recreation
- Modest fashion

The Global Islamic Economy Report 2019/2020 estimates that the 1.8 billion Muslim consumers around the world spent US$2.2 trillion in 2018 across the food, pharmaceutical, and lifestyle sectors that are impacted by Islamic faith-inspired ethical consumption needs[4]. This spending reflects a healthy 5.2% year-on-year growth that is forecasted to reach US$3.2 trillion by 2024 at a Cumulative Annual Growth Rate (CAGR) of 6.2%.

Halal Food has seen tremendous growth in the last couple of years as a result of Technology and the development of halal hubs. Apps are linking consumers with halal restaurants and brands while a new halal traceability platform connects the entire supply chain, from producers to auditors and certifying bodies. Muslim spend on Food and Beverages was valued at $1.4 trillion in 2018 and forecast to reach $2.0 trillion by 2024.

Muslim-friendly tourism, which caters for Muslim travellers and is sensitive to the beliefs and practices of Muslims, is now becoming more common and more available. New products and services include private beach resorts, halal food hotels, Islamic-values based hotels, halal

ratings, and more. Numerous travel agents are offering more halal holidays as well as dedicated services for pilgrimage. Muslim spend on travel was valued at $189 billion in 2018 and is forecast to grow to $274 billion by 2024.

Modest fashion is another rallying sector within the Islamic economy, with a number of new brands emerging and heightened investment in online portals. Muslim spend on apparel and footwear was estimated to be worth $283 billion in 2018 and is projected to grow to $402 billion by 2024.

Halal pharmaceuticals are another area of the Islamic economy which is seeing heightened demand as more funds invest in this sector and a rapid demand grows for halal certification, especially in Malaysia, Indonesia, and South Korea. Muslim spend on pharmaceuticals was $92 billion in 2018 and is projected to grow to $134 billion by 2024.

Halal cosmetics is a further growth area. New brands are launching while e-commerce retailers are expanding offerings and attracting investment. Muslim spend on cosmetics was estimated at $64 billion in 2018 and is forecast to reach $95 billion by 2024.

One sector which the Islamic economy has not expanded to until recently is Halal media. Halal media and recreation has a growing portfolio of offerings, from movies and content, to apps aimed at Muslim lifestyle needs. Mainstream studios and streaming platforms are also seeing the opportunities the Muslim market has to offer and is developing content to attract this market sector. Muslim spend on media and recreation was $220 billion in 2018 and is forecast to reach $309 billion by 2024.

Last but not least, Islamic finance has continuously grown with Islamic capital markets enjoying growth as well as traditional Islamic banking services and products. Islamic Fintech falls within the Islamic Finance sector in the Islamic economy. The Islamic finance industry was estimated to be worth $2.5 trillion in 2018 and forecast to reach $3.5 trillion by 2024. The Islamic Finance industry incorporates the following:

- Islamic banking
- Islamic takaful
- Islamic capital markets
- Islamic social finance
- Islamic regulators
- Islamic microfinance
- Islamic alternative finance
- Remittance

Islamic Fintech is growing each of the above and has the potential to disrupt and develop all of these areas.

Fintech as Tech-Savvy Firms

As mentioned above, Fintech not only refers to the sector and union between finance and technology; it is also now commonly used to refer to companies which are involved in delivering financial services through digital platforms and cutting-edge technology. The term can refer to start-ups, technology companies, or even legacy providers. The lines are blurring and it's getting harder to know where technology ends and financial services begin. PwC outlines the Fintech ecosystem as **A**s, **B**s, **C**s, and **D**s[5]:

- **A**s are large, well-established financial institutions such as Bank of America, Chase, Wells Fargo, and Allstate. We sometimes refer to these as "incumbents."
- **B**s are big tech companies that are active in the financial services space, but not exclusively so, such as Apple, Google, Facebook, and Twitter.
- **C**s are companies that provide infrastructure or technology that facilitates financial services transactions. This broad group includes companies like MasterCard, Fiserv, First Data, various financial market utilities, and exchanges such as NASDAQ.
- **D**s are disruptors: fast-moving companies, often start-ups, focused on a particular innovative technology or process. Such companies include Stripe (mobile payments), Betterment (automated investing), Prosper (peer-to- peer lending), Moven (retail banking), and Lemonade (insurance).

We have now established a working definition of Fintech for our purpose and we can simply say that Fintech is about using technology to deliver financial services and products to consumers. We have also outlined some of the different types of faces in Fintech through PwC's creative breakdown. However, Fintech is not a static reality; it is a growing phenomenon. Fintech is continuously morphing and manifesting new faces with intersections between financial services and technology at different points of a business lifecycle. PwC's **A**s, **B**s, **C**s, and **D**s can all be considered as different sectors in motion, all moving toward each other over time. For example, financial institutions are becoming more technology focused. At the same time, big tech companies are offering peer-to-peer payment solutions over social networks and email. Meanwhile, disruptors are providing financial services that, until recently, you could get only from banks or financial advisors.

In a nutshell, Fintech is a new generation of tech-savvy firms that are supported by disruptive technologies such as behavioural and transactional analytics, machine learning, big data, blockchain, biometrics, and cloud computing. Fintech allows conventional market participants to overhaul the old-fashioned procedures, operational models, and infrastructures which eventually renovates the end-user experience.

Impact of Fintech

We are all Fintech consumers and beneficiaries. Fintech is changing the world of finance for consumers in a myriad of ways. For example, you can now open a bank account over the Internet without physically visiting a bank. You can link the account to your smartphone and use it to monitor your transactions. You can even turn your smartphone into a "digital wallet" and use it to pay for things using money in your account.

Fintech is increasingly changing the insurance and investment industries. Car insurance providers now sell "telematics-based" insurance where your driving is monitored using data collected via your smartphone or a "black box" fitted in your car. This data can then be used to determine how much you pay for your insurance policy. In the future, it may be possible to buy insurance on a short-term or "pay as you go" basis.

Fintech means that customers and investors can now invest over the Internet on an "execution only" basis; without any face-to-face interaction and without having to call a broker every five minutes. Robo-advisory services have removed almost all human interaction when it comes to investing, allowing Fintech firms to scale massively without the need of human resources and empowering customers with more choice and products on a user-friendly digital platform.

In summary, Fintech is replacing everything we were accustomed to and giving us access to the same services and products through the click of a button or a much more convenient intermediary.

Fintech Areas

There are many diverse applications where Fintech is transforming financial services and changing the way consumers interact with the products businesses are offering. Here are some of the areas where Fintech is being applied:

Blockchain

Blockchain is one of the more headline-catching elements of Fintech. It is influencing how financial services interact, record data, and exchange assets. This is executed through the use of smart contracts, consensus algorithms, blockchain-powered trading platforms, decentralized ledgers, and immutable records. Blockchain provides more private, secure, and transparent means of tracking the complete lifecycle of financial transactions.

Crypto-assets

Crypto assets are cryptographically secured digital representations of value or contractual rights that use some type of distributed ledger technology (DLT) and can be transferred, stored, or traded electronically.

Insurance (InsureTech)

InsureTech is the delivery of insurance products and services through the adoption of digitized financial ecosystems which enhance customer experiences and efficiency for the insurers. Smartphone apps, drones, Internet of Things (IoT), Artificial Intelligence (AI), Machine Learning, and other tools are being integrated by insurers to provide more impact through their services to those consumers and other firms that need them. InsureTech is steadily changing the way insurance products are being perceived by customers, with many benefits being offered like online marketplaces, more convenient and personalized approaches, customized profiting, and much more.

Regulatory (RegTech)

RegTech was introduced in 2015 by the Financial Conduct Authority, who described it as "a subset of Fintech that focuses on technologies that may facilitate the delivery of regulatory requirements more efficiently and effectively than existing capabilities." RegTech encompasses the use of innovative technology to aid better compliance and the delivery of easy-to-integrate, secure, and cost-effective regulations. In a world where finances are being taken over with the numerous applications of technology, new regulatory models are needed to catch up with the advancements being made. Basically, RegTech is used to standardize and facilitate transparent regulatory processes that automate the whole compliance system. Regulatory reporting, risk management, transaction monitoring, and compliance are a few of the ways RegTech is being used to provide regulatory solutions. Some RegTech platforms which offer such solutions are Regis-TR, Provenir, Continuity, and IdentityMind[6].

Lending (LendTech)

LendTech streamlines the entire process of lending solutions for consumers. Smart systems, which use Artificial Intelligence and Machine Learning algorithms, process and verify identity credentials to ensure error-free results. Forecasting income prospects, assessment of the borrower's track record, appraisal of collateral value, and predictions of changes are facilitated by the inclusion of technology in lending processes.

Payments (PayTech)

PayTech is the digitisation and enhancement of the payments industry via the development and integration of digitized processing applications and diverse processing networks. Wearable technology and smart devices are being developed for consumers to facilitate better digital connectivity and consumer identity protection. The management of assets and processing of various payment transactions is made secure and easy through the use of Payment Technology (PayTech). Payment platforms that make use of PayTech include PayPal, WePay, Square, and MobiKwik.

Mobile wallets and other integrated payment solutions are being used widely by business models and individuals to facilitate and conduct payment operations through the use of technology. This is a major area of Fintech, seeing as every transaction made by any consumer involves the payment process. Consumers worldwide are making use of digitized wallets like Apple Pay, Google Wallet, Square Cash, and Zelle. These platforms are easy-to-use, secure, and improve the overall consumer experience.

Remittance services have been revolutionised with the latest wave of digital transformation. The entire process is now more streamlined, secure, faster, and easier for consumers and businesses. Sending money overseas through the use of SWIFT or Peer-to-Peer networks helps in reducing those fees normally incurred by traditional means.

Personal Finance (WealthTech)

Technology is augmenting and amplifying the manner in which personal wealth and retail investments are managed. This form of digital transformation is advancing existing solutions as well as developing new platforms. WealthTech simplifies the entire investment process and is integrated into the finance sector by the use of micro-Investment, robo-retirement, portfolio management platforms, and others.

Alternative Finance

Alternative finance differs to traditional banking or capital market finance through technology-enabled 'disintermediation', which means utilising third party capital by connecting fundraisers directly with funders and, in turn, reducing transactional costs and improving market efficiency. Crowdfunding is the most common form of Alternative Finance.

Proptech

Proptech, or property technology, is the application of technology to the real estate sector. Fintech plays a significant role in proptech by offering innovative financing solutions, such as

real estate crowdfunding, tokenization of assets, and mortgage technology. Proptech aims to simplify and streamline property transactions, management, and investments, making the real estate market more accessible and efficient for all stakeholders.

Accounting

Machine Learning, Artificial Intelligence, Cloud Computing, Digitalized Tax platforms, and other technological advancements are being used to facilitate the automation and transparency of accounting operations. The use of technology in this area of finances has helped improve the access and analysis of data through the use of software and tools. Technological advancements have expedited operations like invoice management, cashflow forecasting, and other accounting services.

Consumer Banking (BankTech)

Many banking institutions are embracing the use of digital technology to provide their services in a more streamlined and effective manner. BankTech involves the use of digitized platforms to offer banking solutions and products of which consumers may take advantage. Better user experiences, reduced costs, and less friction in operations are a few of the benefits BankTech offers over traditional means of banking.

Chapter 2: The Tale of Islamic Fintech

Fintech has a history which goes back many centuries. It is not something new. Even if the buzzword Fintech is new, technology and finance are not. Technological advancements, in whichever form, have always refreshed the way finance and money management have worked in previous centuries. Finance and technology have been inextricably intertwined since the very beginning. If we look at the earliest days of finance dating back thousands of years, the initial impact of technology was in the context of building systems for keeping records of government finances or payments for taxes and agricultural production. Bartering is said to be a common practice in earlier times, but the innovation of money as a medium of exchange redefined transactions.

Money is a form of technology that allows us to physically handle the ideas embedded in finance. Hence, financial technology has a very, very long history indeed. Caliph Abdul Malik ibn Marwan introduced the first Islamic dinar and dirham in the year 76 Hijrah. During the Mamluk dynasty (872-922 A.H/1468-1517 CE), *Fulūs* (copper coins) came into existence to use in small commercial transactions. Its purchasing power was very limited, being for common daily needs of life. In the Ottoman empire, money was further developed. The Ottomans produced the currency named *Qaimah* in the form of paper money. In 1914, the Ottomans officially declared that paper money was the only legal tender for the medium of exchange[7].

Similarly, cheques and debt certificates allowed for the flow of funds at a faster rate than ever before. Cashless transactions were another financial technology breakthrough which increased market efficiency. In the early Islamic era, the Islamic literature makes references to the word *Sakk,* meaning certificate or order of payment. Sakk was another form of technology; papers representing financial obligations originating from trade and commercial activities.

Other technologies which have reshaped finance include the evolution of the joint stock company or the corporation, forms of financing like banking, or, more recently, stocks. Although the positive and negative impacts of these technologies are debated, they have changed the landscape of the financial system.

The 19th century flourished with the technological creation of financial infrastructure. In this age, new systems like the telegraph, transatlantic cables, steamships, and railroads assembled financial interlinkages between countries, allowing for the rapid transmission of trades, transports, and money transfers worldwide. 1838 saw the development of the telegraph. Giovanni Caselli invented the pantelegraph in 1865. This technology is most famous for the method in which banking transactions verified signatures. Not so long after, in 1866, the first transatlantic cable was devised. This transatlantic cable facilitated the first cross-border

financial transaction in the late 19th century. It allowed financial centres such as New York, London, and Paris to communicate and exchange data. Towards the end of the 19th century, Barclays Bank launched its Cairo branch to process financial transactions related to the construction of the Suez Canal. This led Sharia Scholars to object and declare the conventional banking system as non-compliant with Islamic principles. This was a major catalyst in developing the Islamic financial system.

Most of the underlying development to support Islamic Fintech occurred in the 20th century. Of course, no century's development can be negated; every previous century has supported the development of the subsequent century. The 20th century's development would not have been possible if the people of the 19th century did not innovate and push themselves. History works in layers. One generation passes its legacies to the next and each of them build on top of their ancestors' technologies.

During the Second World War, countries exerted all their efforts in developing codes for secure communications, especially in military and intelligence operations. Not only were countries looking to develop encrypted methods to communicate – their endeavours to crack and break codes increased too. Encoding and decoding led to the development of computer technologies and artificial intelligence, too. The 1950s saw the development of credit cards with Diners Club and American Express launching their cards. The 1960s witnessed Quotron Systems introduce the Quotron in 1960, the first electronic system to provide selected stock market quotations to brokers through desktop terminals. The global telex network was established in 1966, which played a crucial role in providing the communications necessary for the next stage of financial technology development[3].

It was during the 1960s that an operational Islamic bank was developed in Egypt by Ahmed El-Nagar. In the same period, Malaysia saw the establishment of the Muslim Pilgrims Savings Corporation, which helped pilgrims in Malaysia perform Hajj. This corporation was later renamed Tabung Hajj and helped pilgrims invest their Hajj savings in a Sharia-compliant manner. Tabung Hajj led to the development of Bank Islam Malaysia. Meanwhile, code-breaking tools were being developed by International Business Machines (IBM), whilst the first calculator was product by Texas Instruments in 1967. The first handheld calculator was transformational in the way that finance operated on a day-to-day basis. The calculator can be considered the parent of the smartphone, perhaps the most transformative technology in the context of Fintech. Barclays Bank introduced the first automated teller machine (ATM) in 1967, calling it a "robot cashier," which allowed customers to get cash around the clock. The ATM and the calculator arguably mark the commencement of the modern evolution of today's Fintech. That ATM allowed, over the next several decades, for a transformation in the relationship that people had with money and with finance.

1967 thus marks a period where we begin to see a process of digitisation. Digitisation is taking analogue processes and systems, such as handwriting or the physical calculation of

money, and digitising them: transforming them into a digital environment. The 1970s and 80s saw other countries follow with the establishment of Islamic banks in their countries, such as Dubai, Kuwait, Sudan, and Saudi Arabia. However, one major establishment of the 70s was the Islamic Development Bank. The Islamic Development Bank started operations in 1975, headquartered in Jeddah, Saudi Arabia. Clause one of its charter states that it is "to foster economic development and social progress of member countries and Muslim communities individually as well as jointly in accordance with the principles of Sharia." The first Islamic insurance (or *takaful*) company — the Islamic Insurance Company of Sudan — was established in 1979. The Amana Income Fund, the world's first Islamic mutual fund (which invests only in Sharia-compliant equities), was created in 1986 in Indiana.

The transition from an analogue to a digital economy began in the 1960s. By the 1980s, a digital economy had taken shape. The Clearing House Interbank Payments System, or CHIPS, was established in 1970 to transmit and settle payment orders in American dollars for some of the largest and most active banks in the world. The NASDAQ—National Association of Securities Dealers Automated Quotations—was created in 1971 in the United States. The Society for Worldwide Interbank Financial Telecommunications, or SWIFT, was established in 1973 to solve the problem of communicating cross-border payments. These payment systems allow large value payments to take place today on a real-time basis, which underpins massive volumes of transactions around the world. SWIFT enables communications between domestic digital payment systems.

The first online brokerage, E-Trade, was founded in 1982, by executing the first electronic trade by an individual investor. Britain saw the first online banking experience by the Bank of Scotland for the Nottingham Building Society (NBS) customers in 1983. All these developments are jigsaw pieces in the Fintech puzzle. During this era of digitisation, companies doubled and tripled their IT spend, as well as developed innovative risk management technology to address the varying risks. In the 1980s, stock exchanges from New York to Tokyo were going electronic, whilst the famous Bloomberg terminals were in ever-increasing use among financial services providers. The Bloomberg Terminal now services hundreds of thousands of customers with everything from the latest information on financial matters to the ability to actually execute trades. It processes approximately more than 60 billion pieces of information from the market per day.

The late 1980s are significant in the history of both Fintech and Islamic Finance. The world experienced a major market crash in 1987 presumably by programme trading, which involved pre-set computerised buy and sell orders being triggered by price drops and causing further drops - and thereby triggering more sales. This manifested the risks involved in digitised cross-border financial connections and transactions, showing that the entire connected market is faced with the same risks.

In 1990, an accounting organization for Islamic financial institutions (Accounting and Auditing Organization for Islamic Financial Institutions, AAOIFI), was established in Algiers by a group of Islamic financial institutions. The same year witnessed the Islamic bond market emerge when the first tradable *sukuk* — the Islamic alternative to conventional bonds — was issued by Shell MDS in Malaysia[8].

The nucleus of Fintech appeared in 1995 when Wells Fargo used the World Wide Web (WWW) to provide online account checking. The Internet merged with finance like never before. By 2001, eight banks in the United States had one million customers online, with other main jurisdictions around the world rapidly developing the same systems and related regulatory frameworks to address risk. In 1996, Citibank began to offer Islamic banking services when it established the Citi Islamic Investment Bank in Bahrain. In 1999 the Dow Jones Islamic Market Index (DJIMI) was established, becoming the first successful benchmark for the performance of Islamic investment funds. In 2002, the Malaysia-based Islamic Financial Services Board (IFSB) was established as an international standard-setting body for Islamic financial institutions. Islamic Finance was equally growing with the technological developments.

By 2005, the first direct digital banks without any physical branches emerged (e.g. ING Direct, HSBC Direct) in the UK. With the dawn of the 21st century, advancements in Internet technology opened the doors to several Fintech companies with consumer-facing solutions. PayPal was launched in 1998 and was among the early Fintech companies that started transforming the way people managed their money through payments. eBay was also one of the first e-commerce websites that permitted consumers to create the market and establish prices for auction items. The digital revolution had truly begun.

Most Fintech entrants and start-ups were providing transfer, payments, investment management, and lending. Envestnet and Yodlee were founded in 1999, Mint in 2006, and Credit Karma in 2007, all providing services for personal finance and investment management. Xoom was founded in 2001 and Payoneer in 2005, both providing services for money transfer and currency. Prosper was founded in 2005, Lending Club in 2006, and OnDeck in 2007, providing lending services. Klarna was founded in 2005, Adyen in 2006, and Braintree in 2007, providing services for payments. Trading and data analysis provider Fintech companies are MarketAxess, which was founded in 2000, Market in 2003, and BATS Global in 2005[3].

Then the Global Financial Crisis (GFC) took place. The world changed. Finance changed. The markets changed. Another evolution of Fintech took centre stage. From the point of view of Fintech, the Crisis played a huge role. Firstly, there was a huge pool of talent that was made redundant and lost their jobs in financial services. This would lead them to either try entrepreneurship or explore different opportunities altogether. Secondly, the GFC resulted in sweeping regulatory changes to prevent the systemic risk that shook the entire system. The

regulatory changes impacted the profitability of the financial institutions and increased the compliance costs. Thirdly, the GFC impacted consumer confidence in the traditional financial system. The lack of trust opened up the floor for tech companies to start offering financial services. 2007 also saw something revolutionary: the iPhone. The smartphone is the device at the heart of the Fintech revolution.

The previous decade has been all about Fintech. Fintech has transformed exponentially, from being merely a digital facilitator for B2B and B2C such as services for banks, financial companies, and digital wealth management, to becoming an industry collaborator, hybrid, and integrated operators. Fintech is now much more about sharing core banking services and banking-as-a-service (BaaS), sharing APIs, Open Banking, co-creation and innovation, leveraging technology and data to create value for its cross-border services, applying machine learning algorithms, and for providing integrated, re-bundled financial services.

Based on a report by Accenture, the amount invested in Fintech has risen from US$930 million to US$57 billion between 2008 and the first half of 2018. As for Islamic Finance, the Global Islamic Economy Report 2019 estimates that the industry is expecting strong growth and will reach USD 3.5 trillion in assets by 2024. The top five growth sectors for Islamic Fintech in 2020 are expected to be Crowdfunding, Challenger Banking, Blockchain and Crypto, Robo-Advisory, and PFM (Personal Financial Management)[3].

Before 2016, the only real manifestation of Fintech in Islamic finance was through crowdfunding platforms. 2016 saw Islamic robo-advisory firms launched as well as an Islamic Account Platform (IAP). The same year witnessed the birth of the Islamic Fintech Alliance (IFT Alliance), Islamic Fintech Hub, and Islamic Peer-to-Peer (P2P) financing.

It was in Malaysia that eight Islamic crowdfunding platform operators came together in April 2016 to announce their alliance and cooperation to develop Islamic Fintech. They called this initiative the Islamic Fintech Alliance (IFT Alliance). The founding members were Blossom Finance, Easi Up, Ethis Crowd, Narwi, Funding Lab, Kapital Boost, Launchgood, and SkolaFund. The alliance had the following three primary objectives:

1. Foster safety and trust by establishing, promoting, and enforcing shared standards for Islamic finance.
2. Broaden the reach of Sharia and social impact financial technology by supporting a network of innovators.
3. Support the development of a sustainable global ecosystem by interfacing with and providing industry insights to regulators and other key stakeholders[9].

Whilst Malaysia was booming with Islamic Fintech, the UK and US began to see the rise of Islamic Fintech. In 2016, Yielders was launched. Yielders is the UK's first Islamic Fintech real-estate crowdfunding platform which is FCA licenced. Across the pond, New York-based Wahed Invest Inc launched one of the world's first Sharia-compliant robo-advisory

platforms. In the same year, Ethis Kapital was given the licence to operate a Sharia-compliant P2P license by the Securities Commission Malaysia; Ethis Kapital concentrates on funding small businesses and real estate development projects.

Since 2016 to date, there have been over one hundred Islamic Fintech start-ups established across the spectrum of Islamic Finance. The Global Islamic Fintech Report 2019 found that 70% of Islamic Fintechs expect to raise an equity funding round in 2020 with an average round size of USD 7M. More mature companies expect to also pursue other forms of funding, namely debt, bridge/mezzanine finance, and SAFE (simple agreement for future equity).

Risk Considerations for Fintech

Fintech is still in its infancy - and booming. However, there will be bumps and hurdles in the road. The following are some challenges and concerns which Fintech will have to respond to in the coming years:

1. Professional liability

Negligent advice and failings in client services are common risks for any company providing financial services. This also applies to Fintechs, who are offering innovative financial products through new distribution models. There are several people from all walks of life launching Fintech products which look and feel good, but without any real substance. Since Fintechs heavily rely on cloud solutions and SaaS (Software-as-a-Service), they have multiple contractors and a reliance on third parties. This adds another layer of liability due to third-party negligence[10].

2. Regulatory environment and compliance

As fintech companies disrupt traditional financial systems, they must navigate an increasingly complex regulatory environment. Financial regulators worldwide are working to strike a balance between encouraging innovation and protecting consumers and the stability of the financial system. Fintech firms must adapt to evolving regulations, ensure compliance, and maintain open lines of communication with regulators to foster a mutually beneficial relationship.

Most regulators have been very accommodating of fintech. Many regulators have developed sandboxes for fintechs to work with the regulators and test their products. However, with every new opportunity in financial services, there are also new regulatory measures that follow. Fintech companies will need to ensure they keep on top of the implementation of suitable and satisfactory risk management systems. As the fintech market evolves, so too will the regulatory environment; a major risk for fintechs will be keeping pace with the regulators'

latest updates. Fintechs will also have to consider differing regulations in multiple territories, should they operate internationally.

3. Cyber security

Fintech firms often deal with high frequency transfers of money and of data. Given their nature of operations, Fintech firms are prime victims and targets of cyber criminals and hackers. Network security, data breaches, or even a denial-of-service attack – as well as damage and rectification costs following these incidents – should be a major concern for Fintech companies. High volumes of payments, transactions, and customer accounts, as well as the fast growth and implementation of new technology, leaves them vulnerable to theft. These thefts could be by an employee or an external party.

4. Data Privacy and Security

Fintech companies often rely on vast amounts of customer data to provide personalised services and improve decision-making. As a result, data privacy and security have become critical concerns. Fintech firms must invest in robust cybersecurity measures to protect sensitive customer data from cyberattacks and data breaches. Additionally, they must adhere to data protection regulations like the General Data Protection Regulation (GDPR) and ensure transparent data handling practices.

5. Consumer Trust and Adoption

Building consumer trust is crucial for fintech companies, as trust plays a significant role in the adoption of new financial services. Fintech firms must demonstrate their commitment to transparency, data privacy, and security to gain the confidence of potential users. Furthermore, they must work to educate consumers about the benefits of their products and services and address any misconceptions or fears that may hinder adoption.

6. Collaboration with Traditional Financial Institutions

Fintech companies can benefit from partnering with traditional financial institutions to access established customer bases, regulatory expertise, and funding. At the same time, incumbent financial institutions can leverage fintech innovation to improve their services and stay competitive. However, fostering successful partnerships requires overcoming challenges such as differing organisational cultures, regulatory complexities, and concerns over sharing sensitive data.

7. Talent Acquisition and Retention

As fintech continues to grow, so does the demand for skilled professionals with expertise in technology, finance, and regulatory compliance. Attracting and retaining top talent is crucial for fintech companies to maintain their competitive edge and drive innovation. Fintech firms must invest in employee development, create inclusive work environments, and offer competitive compensation packages to secure the best talent in the industry.

8. Scalability and Sustainability

For fintech companies to thrive in the long term, they must focus on scalability and sustainability. This requires developing a clear business strategy, adopting scalable technology infrastructure, and securing stable funding sources. Additionally, fintech companies should consider their environmental impact and adopt sustainable practices, such as utilising energy-efficient data centres and promoting paperless transactions.

9. Technology failure

Fintech firms rely heavily on technology and the Internet. Any disruption to this infrastructure of theirs can disable their entire operation. Technology failure can lead to heavy financial losses and dissatisfied customers.

10. Third-party reliance

Fintechs are heavily connected third-party service providers; this interconnectedness can potentially result in systemic risks. With Fintech firms providing services to other financial institutions and legacy institutions, the web increases, bringing more risk and exposure to any operational downturn.

Chapter 3: Blockchain

Understanding Blockchain

The word blockchain is composed of two words: block and chain. Blockchain is called blockchain because data is stored in blocks and connected in a chain. Blockchain is a list of records called blocks that are linked using cryptographic means. At a very high level, blockchain is software; software is merely a set of instructions, data, or programs used to operate computers and execute specific tasks. All the intangible elements on a computer are generally regarded as software. Common examples include applications, scripts, and programs. Hardware, on the other hand, refers to the tangible elements of computers. Since blockchain is software, it only exists as intangible records and strings of code. It is very unlikely that an average person will see the underlying infrastructure of a blockchain or the mechanical operations. At most, they will experience a blockchain-based service rather than see a blockchain. An analogy for this is a word processor; most people do not know what is happening mechanically in the backend whilst an article is being written, yet they benefit from using the word processor. Not all people need to understand exactly what's underneath, they just need to understand what they can do with it. Since blockchain is software, it is simply a programming code that translates into a usable interface when it is downloaded onto a computer. Different companies can build apps in virtual layers on top of this code to make the information more accessible and useful to the people who access it[11].

What type of software is blockchain? In essence, it is an online ledger. A ledger is a system to record and store information - as such, books, and documents have been traditionally referred to as ledgers. Many types of data can be stored on the ledgers, such as:

- Identification data
- Various statuses such as employment
- Memberships and subscriptions
- Criminal records
- Economic data
- Ownership evidences
- Cash balance owned by someone
- Assets and liabilities
- Profit and loss statements

Although we have defined blockchain as a software that essentially provides ledger services, blockchain is not cryptocurrency. Rather, it is the digital ledger that underlies the operations of cryptocurrencies and allows for their existence by recording and storing their data. The information of who owns, transfers, and sells a digital asset is all stored on a blockchain. Similarly, blockchain is not another Java or Python, meaning it is not a simple programming language. In the same light, blockchain is not cryptographic codification.

Considering the above, blockchain is really a new type of technology which features a sequence of blocks or records chained together and distributed among its users. It facilitates an immutable record of transactions that do not need an external governing authority to validate the authenticity and integrity of the data. Although financial transactions are the most common type of data stored and transferred on blockchains at present, any type of information and data can be recorded on the blockchain. Blockchain can be summarised as "an incorruptible digital ledger of economic transactions that can be programmed to record not just financial transactions but virtually everything of value."[12]

The Key Concepts Underlying Blockchain

The following are the key underlying concepts which give blockchain the edge it has:

- Cryptographic Hash
- Immutable Ledger
- P2P Network
- Consensus Protocol

1. Cryptographic Hash

A hash is a cryptographic function that transforms any input data into a fixed-length string of numbers. Hashing is not an "encryption"; we can't retrieve the original data by decrypting the hash, it's a one-way cryptographic function. Every single input of the hash function will produce a different output and the result is deterministic: if you use the same input, the output value will be always the same. This one-way conversion is one of the most key features of hashing. As a result of this, the original input cannot be deciphered. As an example, Bitcoin's hashing is known as the Secure Hashing Algorithm 256 (SHA-256)[13]. This hashing function gives an output result of 256-bits, regardless of the input. An example of a hash is as follows:

0000000000000000e067a478024addfecdc93628978aa52d91fabd4292982a50

Transactions are grouped into blocks, which are the fundamental units of a blockchain. Each block contains a set of transactions, a timestamp, and a reference to the previous block in the chain. This reference is the cryptographic hash of the previous block, linking the blocks together and forming a chain. In blockchain, every block has a hash of the previous block. The previous block is always known as the parent block. Thus, the present block will have the hash of the parent block in it. When any data is changed in the parent block, the hash of the block will be changed; this will affect the present block because it has the data and hash of the previous block. In summary, hashing converts any type of data stored into a string of numbers within the block.

2. Immutable Ledger

This feature is closely related to the cryptographic hash. The blockchain is a chain of blocks. Every block has its own hash with a hash for previous blocks and an overall hash of this current block. Each mined block references the previous block. Therefore, if any one block's information is changed, while it does change the overall hash of that particular block, it also impacts the following blocks because they had a hash based on the unchanged data in the previous blocks.

Blockchains are distinguished by their ability to store information immutably, meaning the information cannot be changed or hacked. This feature is built into the design of the technology. The notion of immutability significantly increases trust in a system and replaces many functions in a traditional system. As an example, if you are involved in international trade finance and you want to pay an overseas company, you would have to use your bank to communicate with the recipient bank (through intermediary banks) that you are sending this amount and that you have this amount in your account. This process and transfer can take some time with the verification and authorisation checks. At the same time, you would be paying a fee - essentially to cover the work required to validate the transaction and ensure trust. With blockchain, all these intermediaries are not required as the funds have already been securely and immutably recorded as yours to spend. The owner in a blockchain has already been recorded; that is something that cannot be changed due to the hashing, but equally so due to everyone holding a record too. Therefore, you cannot double spend or have an infinite balance of funds, as what you have is already defined in the blockchain. As such, people conclude that the blockchain is somewhat a system which does not require parties to ensure trustworthiness and does not require third-party authentication of the activities, as the underlying infrastructure of blockchain is immutable[14].

3. P2P (Peer-to-Peer) Network

Blockchain does not need any third-party authority to oversee the blockchain's operations as the ledger is distributed among all its members. All the members have a copy of the data, whilst they share the news of any new transaction or input to the entire network. This way, it is not possible for anyone to alter the information in the blocks since it is not only stored by an individual entity, but an entire network of people. Once a block of information is validated, it is added to the chain and all users then update their records. Even if an attacker were to modify one chain and distort the data within, the network would reject this altered copy of the blockchain as it is clearly different to the network's record.

4. Consensus Protocol

Since there is no third-party authority validating the data, there needs to be a mechanism to ensure that the data is genuine. Different networks use different mechanisms to validate that data; these mechanisms are called consensus protocols. The users of a blockchain need a

mechanism to ensure that they all agree on the validity of the chain at present before they move on and add further blocks with new data to the chain. The users all have a copy of the blockchain or distributed ledger. Therefore, anyone can submit information to be stored and saved on this ledger. Generally, the mechanism to verify or the consensus protocol is set before the blockchain is created. The consensus protocol provides a mechanism to review and confirm the data so that it can be added to the rest of the data on the blockchain. Since blockchain networks do not generally have a centralised authority or a third-party governing entity who oversees what is correct and incorrect, all the users on the blockchain must agree on the state of the network, following the predefined rules which are called protocols. Consensus can be defined as agreement, protocols are rules[15]. Simply, consensus protocols could be viewed as "rules of agreement." Some of the common types of protocols are as follows:

a. Proof-of-Work (PoW)

This is deployed by Bitcoin and several other crypto-assets. On the Bitcoin blockchain, Bitcoin transactions are recorded into a block with a timestamp. This data is then shared to the entire network. The members of the network then compete and try to solve the mathematical riddle with trial and error methods until one member cracks the riddle and arrives at the answer. They then share this information with the rest of the network. When the network majority agree that this member has solved the puzzle, a consensus is formed.

b. Proof-of-Stake (PoS)

The overall objective of PoS is similar to that of PoW, which is to achieve distributed consensus. Stake in this regard means a crypto-asset owner pledging their crypto-assets to indicate that they wish to validate transactions. That is the essence of PoS; that users achieve consensus by being required to stake an amount of their tokens, so they have a chance of being selected to validate a block of data. As a result of validating, the user is rewarded for their effort by being granted tokens. In PoS, the member is chosen in a semi-random, two-part process. The first element quantifies the amount staked by the member. Staking involves depositing a number of tokens into the system, locking it in what you can think of as a virtual safe, and using it as a collateral to vouch for the block. The greater the number of tokens staked by a member, the greater the chance of selection. In most PoS models, members are incentivised by a promise of pay-outs in the form of transaction fees. The second element adds the 'random' to the semi-random selection process, although the way in which this is done differs from blockchain to blockchain. The two most commonly used methods are Randomised Block Selection and Coin Age Selection[16].

Implementing Blockchain

Implementing blockchain in a company as part of one's digital infrastructure is a business question. A business must perform a cost-benefit analysis before considering the adoption of blockchain. Some of the key considerations are as follows:

1. Scalability – Some of the aspects that need to be addressed and considered are the complexity of data structures, transaction speeds, processing speeds, and potential limitations.

2. Maintainability – the versions, migrations, and overall maintenance need to be costed.

3. Interoperability – the ability to integrate with current systems and data sources is a key concern for a business.

4. Cost of ownership – the cost of implementing the system, the infrastructure, team, training, and maintenance all need to be forecasted.

5. Compliance – for many companies, the potential impact on regulatory requirements and regulatory compliance will have to be gauged to ensure compliance. This can be a resource-heavy task.

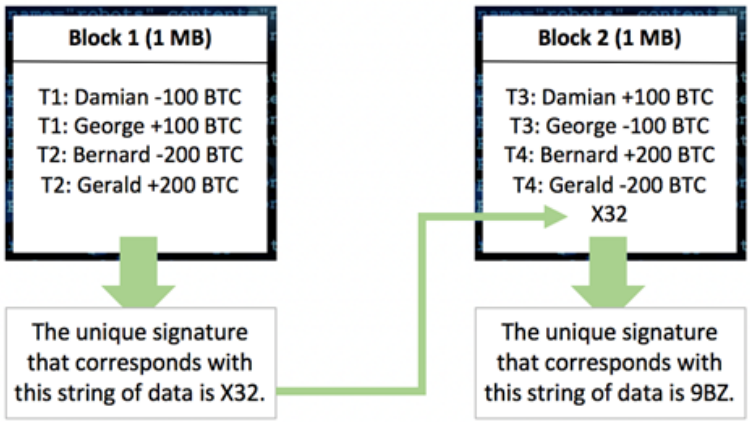
How Blockchain Functions

The following steps are an example of how blockchain functions:

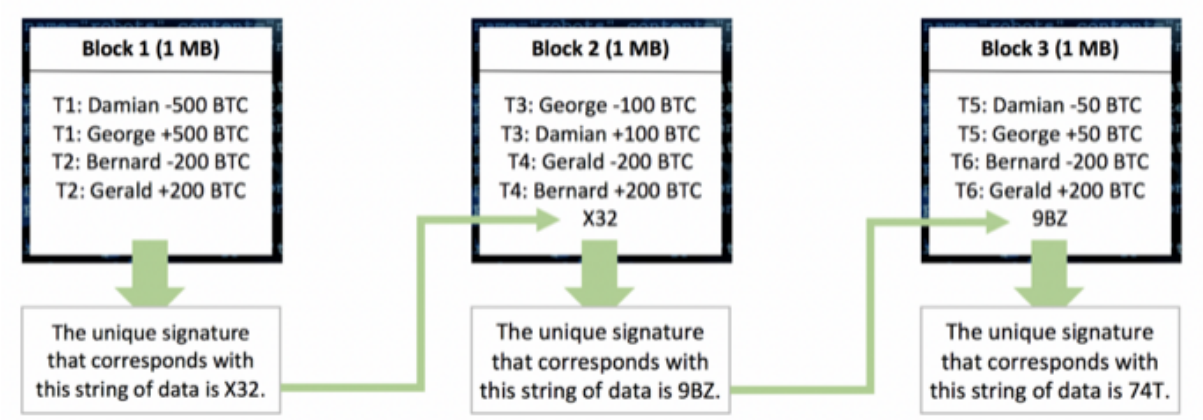
Step 1: Transaction data[17]

The Bitcoin blockchain records transactional data for the transfer of Bitcoins. Each block on this blockchain has the storage capacity of 1 MB. Hence, it is a huge ledger and record of Bitcoin transfers from the very first transaction.

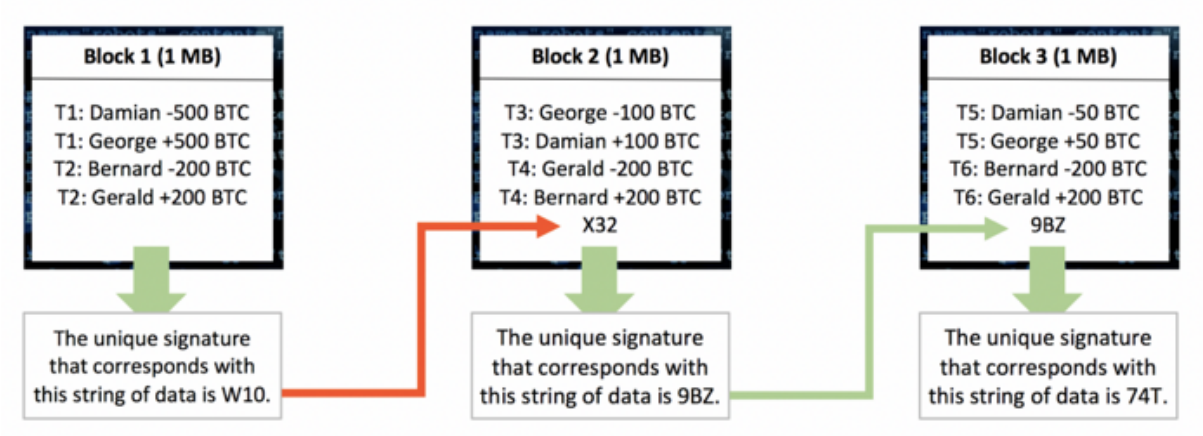
Step 2: The chaining of the blocks with hashes



Every block in the blockchain not only records data, but is linked and chained to the block before and after. This link is created through digital signatures, as every block gets a unique digital signature that matches the exact data within the block. If anything is altered, edited, or removed in the block, the digital signature will be changed to a different signature. This all takes place through hashing. Thereafter, the data in block 1 is linked to the data in block 2. This link is attained through the signature of block 1 appended to block 2; block 2 is similarly connected with block 3, so on and so forth as follows:



Since all the blocks are connected and the data is uniquely matched with a signature, if any data is altered, it will change the signature and code. For example, if the data in block 1 is changed as follows, it will change the signature:



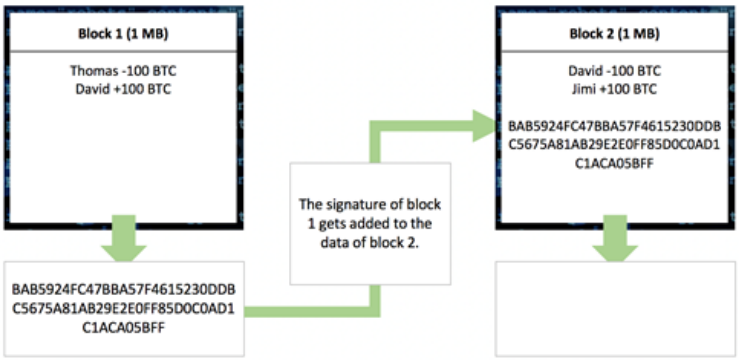
The signature W10 does not match the signature in block 2 anymore. Therefore, block 1 and block 2 are no longer linked together. This will tell the record keepers of this ledger that the information in block 1 has been tampered with. As such, the record keepers will reject this version of the ledger and resort back to the previous version. If a single block's signature is changed, it will mean that there will have to be a new signature for every block that follows this block, as they are all connected.

Step 3: How the signature (hash) is created

Signatures are created by the cryptographic hash function, as discussed before. This converts any string of input and turns it into a unique 64-digit string of output. Any data or text inserted into the block will give a unique code, such as:

761A7DD9CAFE34C7CDE6C1270E17F773025A61E511A56F700D415F0D3E199868

If the input data was changed by so much as a full-stop or a comma, the code will be different. It is these codes which each block has and which is connected to the next block in the chain, such as:



There are different forms and types of hash functions. The hashing function used by the Bitcoin Blockchain is called SHA-256. However, this does not mean that anyone can come and make their own signature or tamper with signatures. Only certain signatures are accepted; they are the output of something called mining in the Bitcoin blockchain.

Step 4: Qualifying a signature

A block can only be accepted on the network if it matches a particular format - for example, only blocks with a signature starting with at least ten consecutive zeros. To get the right signature for the block, the data in the block must be amended repeatedly until a signature with ten consecutive zeros is formed. Because the transaction data and metadata (block number, timestamp, et cetera) need to stay the way they are, a small specific piece of data is added to every block that has no purpose except for being changed repeatedly in order to find an eligible signature. This piece of data is called the *nonce* of a block. The nonce is just a random set of numbers.

Considering everything above, a block contains the following information:
1) Metadata;
2) Transaction data;

3) Signature of the previous block; and
4) Nonce.

The repeated revision and changing of the nonce and hashing the data within the block to get the right signature is called mining. In the process known as mining, miners spend electricity in the form of computational power by constantly changing the block composition (nonce) and hashing it until they find an eligible signature (output). Anybody on the blockchain network can take part in this process by downloading and starting the mining software. It is almost a guessing game and trial and error. The mining software run by the participants will keep generating numbers through trial and error to find the correct sequence that matches the nonce. Whoever matches the nonce will validate the transaction and be rewarded with a Bitcoin.

Blockchain Governance

If we consider the Bitcoin blockchain, it adopts a governance model of democracy. The ledger will be that which the majority of the users say is the accurate version of the ledger. The blockchain protocol does this automatically by always following the record of the longest blockchain that it has, because it assumes that this chain is represented by the majority. After all, it requires the *majority of the computational power to create the longest version of the blockchain.*

Blockchain Sharia Considerations

Blockchain is a new type of software and technology. Technology is neutral, from a Sharia perspective, as it is only an enabler. Adopting new software or technology is lawful and permissible; the default state is of permissibility in such matters. The Islamic legal maxim states:

"Permissibility is the state of all things by default."[18]

Software can be designed in various ways to deliver various services. Hence, the objective and function of a blockchain must be considered when reviewing a particular type of blockchain. Blockchain can be likened to a knife; it can be used in permissible and impermissible ways. A knife can be used for a virtuous action such as cutting fruits to serve one's guests, or it can be used for heinous crimes like murder. The knife is, of course, not to blame, but the user and the way they use this tool. Similarly, blockchain is technology. It can be deployed in rewarding and permissible avenues, or it can be used to record data of impermissible activities.

When reviewing a blockchain from the lens of Sharia compliance, there are two levels which need review:

1. macro-level
2. micro-level

The macro-level review should focus on what this particular consensus algorithm is validating and what the blockchain is serving - what it is keeping a record of and facilitating. The macro-level review ensures that the processing endeavours of nodes is not actively facilitating non-Sharia-compliant activities. This is vital because, even though the micro-level requirements might be structured in a compliant manner, the overall output can facilitate a non-compliant activity or service.

The micro-level review should focus on the process of an algorithm, transaction fees, distribution of rewards, nodes' rights, nodes' input, and the overall governance protocols, if any. A process can be developed in a non-Sharia-compliant way wherein one party is unjustly disadvantaged, or the process is ambiguous and creates discord. Likewise, fees can be unwarranted, unfair, or unjustified. Fees can also be structured in a non-Sharia-compliant manner. Rewards in a system can potentially be distributed in a non-Sharia-compliant mechanism and can lead to a gambling scenario. The rewards' distribution mechanism must be analysed to ensure a gambling scenario has not been orchestrated.

Furthermore, the rights of participants in any system can be constructed in various ways. Sharia has principles to ensure that any participant in any system is not taken advantage of, nor are they unfairly treated. Thus, the rights of nodes need to be reviewed to ensure they align with the Sharia principles of justice and fairness. Finally, if any blockchain or consensus protocol has specific terms, then those terms must be analysed to ensure that no Sharia right is infringed or breached.

Consensus mechanisms are a decision-making process for a group with some particular objectives, such as:

- **Coming to an agreement**: The mechanism allows the members to come to an agreement.
- **Collaboration**: The mechanism allows for more collaboration between members to serve the interests of the whole.
- **Co-operation**: Every member will work as a team and put their own interests aside.
- **Equal Rights**: Every single member has the same value in voting. Every member is equally important.
- **Participation**: Everyone inside the network needs to participate in the voting. No-one will be left out or can stay out without a vote.

- **Activity**: Every member of the group is equally active. There is no-one with more responsibility in the group.

In regard to consensus algorithms, consensus in and of itself is not an absolute must in every matter in Sharia. Sharia principles allow for valid differences of opinion; the Sharia encourages harmony and cordialness irrespective of the views of people. However, in the context of blockchain, consensus is generally about agreeing to a true or false proposition on the occurrence of an event. The consensus is not based on subjective views and thoughts.

Sharia Review of Proof-of-Work

When considering PoW from a Sharia perspective, a *Ju'alah* structure is the most reasonable. *Ju'alah* is a contract in which one of the parties (the *Ja'il*) offers specified compensation (the *Ju'l*) to anyone (the *'Amil*) who will achieve a determined result in a known or unknown period. In the PoW, the network protocol offers minors new crypto-assets as a reward for mining.

Ju'alah's permissibility is based on a known output, whilst the input is uncertain. It is not affected by the uncertainty that prevails with respect to the subject matter of the contract – that is, the work to be done. It is for this reason that *Ju'alah* is suitable for activities for which *Ijarah* (leasing) is not. The person responsible to deliver the work and the time of delivery of the work should all be quantified in *Ijarah*. Such specification does not materialise in PoW. Furthermore, a *Ju'alah* does not need to be contracted with any specific individual. A *Ju'alah* contract can be concluded by an offer directed towards a specified worker or towards the general public. As such, in a blockchain network, the offer is addressed to all the nodes in the network.

The subject matter of the contract is the work that is agreed upon through *Ju'alah,* as well as the compensation for the work. In PoW-based consensus protocols, the network decides on the compensation. Therefore, it is known in advance.

To consider the PoW as an *Ijarah* is somewhat deficient and inaccurate; an *Ijarah* is contracted with a specific person or group of people (a company) to deliver specific services in a defined timeframe. The uncertainty in the mining process in respect to which node will solve the puzzle creates an issue for *Ijarah* contracts. Ijarah requires all those contracted under *Ijarah* to receive a fee for the work they deliver. If PoW were an *Ijarah*, it would mean many who have worked to solve the puzzle will not be compensated for their effort and time. This is not Sharia-compliant. On the other hand, *Ju'alah* allows for this uncertainty as the reward is not in lieu of a person's services, per se, but the fulfilment of an outcome. Furthermore, *Ijarah* requires the identification of the counterparty. *Ju'alah* has no such requirement. However, it can be said that in a network, your identity is your public key, so to speak.

Miners are also rewarded by transaction fees paid by the sender of the crypto-asset. This is simply a commission and a brokerage fee which can be considered as a *Wakalah* (agency) fee or even another *Ju'alah* from the sender of the cryptocurrency. Although the above analysis is purely of the underlying mechanism, the service of the blockchain and the transactions that are being validated must also be Sharia-compliant for a particular blockchain to be classed as Sharia-compliant.

Sharia Review of Proof-of-Stake

In PoS, the tokens are usually frozen and held in the owner's wallet. This is a mechanism to select a crypto-owner to validate the data on the blockchain. The tokens are generally not transferred to anyone else; it does therefore not affect any lending of crypto-assets to others, nor is Ribā involved. Ownership of these tokens does not go to anybody else generally. Similarly, it cannot be regarded as gambling as staking does not mean you will win at the expense of others. Those involved in the PoS will not lose tokens and the individual earning a reward or fee will not be gaining these fees or rewards from other participants. As such, gambling (*Qimar*) is not involved in PoS and a PoS model neither contradicts nor contravenes Sharia rules, in principle. However, every PoS should be reviewed independently to ensure Sharia compliance.

Chapter 4: Smart Contracts

Smart contracts are one of the most innovative applications of blockchain technology, which is transforming various industries and sectors.

What are Smart Contracts?

According to some writers, the term "smart contract" was coined by computer scientist Nick Szabo in 1994, who defined it as "a set of promises, specified in digital form, including protocols within which the parties perform on these promises". In other words, a smart contract is a digital representation of an agreement that can be enforced by a computer program.

A smart contract is a self-executing program that runs on a blockchain network and performs a set of predefined actions when certain conditions are met. Unlike traditional contracts, which are written in legal language and enforced by courts or intermediaries, smart contracts are written in code and enforced by the consensus of the network participants. This means that smart contracts can automate various business processes and transactions without the need for third parties, fees, or delays.

A smart contract consists of two main components: a set of rules that define the terms and conditions of the agreement, and a mechanism that executes the actions specified by those rules when certain triggers or events occur. For example, a smart contract could be used to automatically transfer money from one account to another when a product is delivered or a service is completed.

Smart contracts are stored on a blockchain, which is a distributed ledger that records transactions in a secure and transparent way. A blockchain is composed of a network of nodes (computers) that validate and store transactions using cryptographic techniques. Each node has a copy of the entire ledger, which is updated whenever a new transaction is added. Transactions are grouped into blocks and linked together using hashes (unique identifiers) to form a chain.

Smart contracts are executed by the nodes on the blockchain according to the consensus protocol (the rules that determine how the nodes agree on the validity of transactions). When a smart contract is triggered by an event or condition, it sends a transaction to the blockchain network, which is then verified and executed by the nodes. The result of the execution is recorded on the ledger as a new transaction, which becomes part of the blockchain history[19].

Smart contracts are a type of computer program that can automatically execute transactions on a blockchain when certain conditions are met. They can be used to facilitate various kinds

of agreements between parties, such as exchanging goods, services, or digital assets, without the need for intermediaries or trusted third parties. A smart contract is essentially a piece of code that is stored on a blockchain, triggered by transactions on a blockchain, and which reads and writes data in that blockchain's database. Smart contracts can be considered program functions: there are inputs, logic to process the inputs, and outputs. Whenever a smart contract is executed, it results in a change of states and an update to the positions of people. Thus, the smart contract can automatically execute predetermined terms and conditions when met. In reality, smart contracts are just programmes that operate exactly as they have been assembled and coded by their developers. The code can be anything – Pascal, Python, PHP, Java, Fortran, or even C++. The purported benefits of smart contracts are the streamlining of complex processes where several intermediaries are needed, as well as transparency, greater synergy, and cost-efficiency[20].

To illustrate how smart contracts work, let us consider a simple example of a smart contract that facilitates the sale of a car between Alice and Bob.

Alice wants to sell her car to Bob for 10,000 USD. They agree on the terms and conditions of the sale and encode them into a smart contract. The smart contract contains rules such as:

a. Alice must transfer the ownership of the car to Bob on the blockchain.
b. Bob must pay 10,000 USD to Alice's account on the blockchain.
c. The payment must be made within 30 days of signing the contract.
d. If Bob fails to pay within 30 days, the ownership of the car reverts back to Alice.
e. If Alice fails to transfer the ownership of the car to Bob within 30 days, the contract is cancelled, and Bob gets his money back.

The smart contract also contains triggers or events that activate the execution of the rules. For example:

a. The contract is signed by both parties using their digital signatures.
b. Alice transfers the ownership of the car to Bob on the blockchain.
c. Bob pays 10,000 USD to Alice's account on the blockchain.
d. The 30-day deadline expires.

The smart contract is deployed on a blockchain network that both parties trust and have access to. The nodes on the network verify and execute the transactions generated by the smart contract according to the consensus protocol. The smart contract can be deployed on a public blockchain network such as Ethereum, where anyone can verify its code and execution. The smart contract will only execute when both Alice and Bob have fulfilled their obligations and when the network nodes have validated the transaction. This way, Alice and Bob can trust that their deal will be executed exactly as agreed, without any fraud, error, or interference.

When Alice and Bob sign the contract using their digital signatures, they initiate a transaction that records their agreement on the ledger. This transaction also locks 10,000 USD from Bob's account into an escrow account controlled by the smart contract.

When Alice transfers the ownership of the car to Bob on the blockchain, she triggers another transaction that updates the ledger with this information. This transaction also releases 10,000 USD from the escrow account to Alice's account.

If Bob fails to pay within 30 days, he triggers another transaction that reverses the ownership transfer and refunds his money from the escrow account.

If Alice fails to transfer the ownership of the car to Bob within 30 days, she triggers another transaction that cancels the contract and refunds Bob's money from the escrow account.

In this way, Alice and Bob can complete their transaction without relying on any intermediaries or third parties. They can also trust that their agreement will be enforced by the smart contract and verified by the blockchain network.

The benefits of smart contracts are numerous. They can:

a. Reduce costs: Smart contracts eliminate the need for intermediaries, lawyers, brokers, escrow agents, and other middlemen who charge fees for their services.
b. Increase efficiency: Smart contracts execute automatically and instantly, saving time and resources that would otherwise be spent on paperwork, verification, and dispute resolution.
c. Enhance security: Smart contracts use cryptography and encryption to protect the data and transactions from tampering or hacking. They also create an immutable record of events on the blockchain that can be audited and traced.
d. Improve transparency: Smart contracts are visible and accessible to all parties involved and to the public (depending on the privacy settings). They also ensure that all parties comply with the rules and obligations of the contract.
e. Enable innovation: Smart contracts can enable new business models and opportunities that were not possible or feasible before. They can also facilitate cross-border and cross-industry collaboration and interoperability.

However, smart contracts also face some challenges and limitations. They include:

a. Technical complexity: Smart contracts require advanced programming skills and knowledge of blockchain technology. They also need to be tested thoroughly before deployment to avoid bugs or errors that could have serious consequences.
b. Legal uncertainty: Smart contracts are not recognized or regulated by most jurisdictions and legal systems. They may also conflict with existing laws or

contractual obligations that are not encoded in the smart contract. Therefore, it is unclear how smart contracts will be enforced or disputed in case of issues or disputes.

c. Data quality: Smart contracts rely on external data sources (called oracles) to trigger their execution or verify their outcomes. For example, a smart contract for crop insurance may depend on weather data from an oracle to determine if a payout is due. However, these data sources may be inaccurate, unreliable, or maliciously manipulated, which could compromise the validity or fairness of the smart contract.
d. Scalability: Smart contracts consume computational resources and network bandwidth to run on a blockchain network. As more smart contracts are deployed and executed, they may face scalability issues such as congestion, delays, or high fees.

Smart contracts have many potential applications across various domains and sectors. Some examples are:

a. Finance: Smart contracts can facilitate peer-to-peer lending, crowdfunding, remittances, sukuk, stocks, dividends, and other financial instruments and services.
b. Insurance: Smart contracts can automate claims processing, payouts, premiums, policies, and other aspects of insurance contracts based on verifiable events or data.
c. Supply chain: Smart contracts can track and verify the provenance, quality, condition, location, ownership, and delivery of goods along the supply chain. They can also optimize inventory management, logistics, payments, and compliance. For example, IBM Food Trust is a platform that uses smart contracts to connect farmers, distributors, retailers and consumers in the food industry. It allows them to share data and verify the origin, quality and safety of food products.
d. Healthcare: Smart contracts can manage patient records, prescriptions, consent forms, insurance claims, medical research data, and other health-related information. For example, Medicalchain is a project that uses smart contracts to create a decentralized health record system that lets patients control their own data and grant access to doctors, hospitals and researchers.
e. Real estate: Smart contracts can simplify and streamline the process of buying, selling and renting properties by eliminating intermediaries, paperwork and fees. For example, Propy is a platform that uses smart contracts to facilitate cross-border real estate transactions. It allows buyers, sellers, agents and lawyers to interact and complete transactions online using cryptocurrencies.
f. Entertainment: Smart contracts can empower artists, creators and consumers by enabling direct distribution, fair compensation and digital rights management. For example, Audius is a streaming service that uses smart contracts to connect artists and listeners without intermediaries. It allows artists to upload their content, set their own prices and earn royalties from their streams.

Example of a Smart Contract

The following is a simple example of a smart contract written in Solidity, the most popular programming language for Ethereum smart contracts. In this example, we will create a basic escrow contract that can hold funds until specific conditions are met.

```
// SPDX-License-Identifier: MIT
pragma solidity ^0.8.0;

contract Escrow {
    // Enums
    enum State {AWAITING_PAYMENT, AWAITING_DELIVERY, COMPLETE,
REFUNDED}
    State public currentState;

    // Variables
    address payable public buyer;
    address payable public seller;
    uint256 public price;

    // Modifiers
    modifier onlyBuyer() {
        require(msg.sender == buyer, "Only the buyer can perform this action.");
        _;
    }

    modifier onlySeller() {
        require(msg.sender == seller, "Only the seller can perform this action.");
        _;
    }

    modifier inState(State expectedState) {
        require(currentState == expectedState, "Invalid contract state.");
        _;
    }

    // Constructor
    constructor(address payable _buyer, address payable _seller, uint256 _price) {
        buyer = _buyer;
        seller = _seller;
        price = _price;
    }
```

```
    // Functions
    function confirmPayment() external payable onlyBuyer
inState(State.AWAITING_PAYMENT) {
        require(msg.value == price, "Incorrect payment amount.");
        currentState = State.AWAITING_DELIVERY;
    }

    function confirmDelivery() external onlyBuyer inState(State.AWAITING_DELIVERY) {
        seller.transfer(price);
        currentState = State.COMPLETE;
    }

    function refundBuyer() external onlySeller inState(State.AWAITING_DELIVERY) {
        buyer.transfer(price);
        currentState = State.REFUNDED;
    }
}
```

Here's a brief overview of how this smart contract works:

1. The contract is initialized with the buyer's and seller's addresses, and the agreed-upon price.
2. The buyer sends the correct amount of Ether to the contract by calling confirmPayment(), which changes the state to AWAITING_DELIVERY.
3. If the seller delivers the product successfully, the buyer calls confirmDelivery(), which transfers the funds to the seller and changes the state to COMPLETE.
4. If there's an issue with the delivery or the transaction, the seller can refund the buyer by calling refundBuyer(), which sends the funds back to the buyer and changes the state to REFUNDED.

The contract uses Solidity modifiers to ensure that specific functions can only be called by the appropriate party (buyer or seller) and in the correct state. This helps ensure that the contract behaves as expected and enforces the escrow conditions.

Keep in mind that this is a basic example, and real-world smart contracts can be much more complex. Additionally, this example does not cover security best practices or optimisations.

Sharia Considerations

Smart contracts are programs which have utility. In and of themselves, they are value-free and inherently neutral. From this perspective, the Sharia value assigned is of permissibility. The Islamic legal maxim states[18]:

"Permissibility is the state of all things by default."

Of course, there are certain exceptions to this rule in areas such as marriage, food consumption, and worship. However, in terms of transactions and transactional processes, the default is that all transactions are permissible by default unless there is evidence to suggest otherwise.

The specific contract considerations and sequences will vary from product to product and transaction to transaction; it is assumed that the core contractual requirements for Sharia compliance such as offer (*Ijab*) and acceptance (*Qabul*) are either done prior to the entries on the blockchain or are executed via conduct through the inputs onto the blockchain. Both forms of execution are acceptable in Sharia. From this perspective, the blockchain and smart contract plays more of a clearing, settlement role. The smart contracts are somewhat of an escrow and a digital intermediary ensuring that the inputs are correct. These programs play the role of solicitors to an extent, ensuring all the inputs are accurately met; this then triggers the next output in a smart contract, permitting the settlement and ownership transfer of whatever is tokenised.

If the smart contract is a digital facilitator for the clearing, settlement, and delivery of the tokenised asset, then a buyer cannot trade the tokenised asset prior to the smart contract execution, as that violates the principle of Sharia. Transacting on something prior to taking receipt - physically, constructively, or digitally - is not valid as the risks associated with the asset are not all vested in you. Of course, trading before settlement is not possible on the blockchain as a person will not have the asset registered with them, nor will it be in their wallet. At the same time, a person should not transact any asset prior to acquiring them with others not involved in the blockchain.

Smart contracts get executed by the blockchain nodes upon submission by a participant. Smart contracts are designed to foster trust between various parties through the benefits of blockchain. Smart contracts allow multiple parties to execute the same code and maintain the same state independently. A transaction can be submitted to any node in the blockchain network, which broadcasts it to the entire network so all the nodes will see the transaction. At some point, the transaction gets processed by each individual node using the executable program in the target smart contract. If the transaction execution is successful, the internal state of the blockchain will be updated. A smart contract may also consider the input to be invalid and reject the transaction as failed, in which case the state is not affected.

The Sharia considerations of processing non-Sharia-compliant transactions and validating such trades requires consideration. Sharia scholars are divided in this regard; some Sharia scholars are of the view that processing any non-Sharia-compliant transaction is not permissible. Other Sharia scholars are of the view that the processor is not responsible for the nature of the contract and many times will not know what type of contract it is. As long as their processing and services do not involve anything non-compliant, this particular activity will be permissible. In this regard, the processing is a remote service and beyond the actual impermissible elements of a transaction.

Nodes validate and update the blockchain. Taking this into consideration, the validation of the smart contract and recording its detail in the ledger can take the form of *Ju'alah*. *Ju'alah* is a contract in which one of the parties (the *Ja'il*) offers specified compensation (the *Ju'l*) to anyone (the *'Amil*) who will achieve a determined result in a known or unknown period. The node would be the '*Amil* and would be compensated by the network for the work it performed in validating and updating the ledger.

Smart contracts are still in their infancy, where there 'smartness' is also being questioned and reviewed. Smart or not, the Sharia principles are applicable in all eras and for all technologies; they will always remain relevant and full of guidance to ensure that the counterparties' rights are maintained and established.

Chapter 5: Crypto-Assets

Digital Currencies, Virtual Currencies, E-Money, and Crypto-assets

Digital currency

Digital currency is an umbrella term which is used for all electronic money, whether it is virtual or crypto in form, regulated, or unregulated. Furthermore, such currency is only available in digital or electronic form and, unlike a dollar bill or coin, is intangible. Generally, digital currencies can only be owned and used through an electronic wallet or designated connected networks. Most digital currency movements have little or no intermediaries. From a more technical perspective, a digital currency is an asset with monetary characteristics which is only available in digital form, rather than physical. Digital currencies are considered to be both assets and value exchange mechanisms[21].

Virtual currency

Virtual currencies are a type of digital currency typically controlled by its creators and used and accepted among the members of a specific virtual community or network. Every virtual currency is digital in that it only exists online, but *not* every digital currency is a virtual currency, because many digital currencies are not specific to a network or a virtual environment. Virtual currencies are designed to represent monetary value, are generally issued and controlled by private issuers, and are used within a network. Unlike fiat currencies, they are not issued by a bank.

E-money

"Electronic money means electronically, including magnetically, stored monetary value as represented by a claim on the issuer, which is issued on receipt of funds for the purpose of making payment transactions".[22]

E-money is essentially the monetary value and electronic representation of fiat currencies in the form of claims. E-money is electronically stored on prepaid cards, smart cards, servers, and/or centrally and has no physical form. E-money is issued by e-money institutions which must hold an e-money license and – as is customary with financial products and services – must adhere to specific duties of care and regulations.

Crypto-assets and cryptocurrencies

Crypto-assets such as Bitcoin and Ethereum are virtual currencies. The 'crypto' in 'cryptocurrency' refers to the fact that many encryption algorithms and cryptographic

techniques are used to secure the network. This level of security also makes cryptocurrencies hard to counterfeit. Crypto-assets operate on blockchains and can be designed privately or be issued by governments.

To summarize, digital currency is the blanket term used to refer to money that exists solely in the digital space. Virtual currencies and cryptocurrencies are digital currencies because they exist online. Virtual currencies are a type of digital currency, but are only available in the virtual world. Cryptocurrencies are digital currencies because they exist online, but they are also virtual currencies created with cryptographic algorithms.

Introduction to Crypto-assets

Crypto-asset is an umbrella term for all cryptos. There are different types of crypto-assets, which can be defined as "digital representations of value that use cryptographic encryption techniques"[23]. Crypto-assets are wholly digital in nature and only exist online. These assets utilise cryptography, peer-to-peer networking, and a public ledger to regulate the creation of new units, verify transactions, and secure the transactions without the intervention of any middleman[24]. Thus, they are digital in nature and use cryptography to verify the validity of transactions. Crypto-operations occur on a decentralised peer-to-peer network and the data is recorded on the decentralised public ledger, also known as blockchain. There are numerous taxonomies of crypto-assets; we will present one such taxonomy.

1. Cryptocurrencies

The first type of crypto can be named cryptocurrencies, currency tokens, or transactional tokens. They are a type of a crypto-asset that are made to serve as payment systems and to transfer value. The purpose of such an asset is purely to serve as a medium of exchange and value transfer. According to Ernst & Young, a cryptocurrency is designed as a general-purpose medium of exchange across applications[25]. They are intended to function as an alternative to fiat currencies. Bitcoin, Litecoin, and Dash are examples of cryptocurrencies and currency tokens, since their primary utility is to serve as a medium of exchange and transfer value. The Financial Conduct Authority terms these tokens as exchange tokens[26]. Cryptocurrencies are designed to serve as currency even though they are not legally recognised as currency or money, but can be accepted by natural and legal persons as a means of exchange and can be transferred, stored, and traded electronically. In some circumstances, cryptocurrencies can be used to pay for goods and services. Cryptocurrencies are typically decentralised, meaning they are not issued or guaranteed by central banks, public authorities, credit institutions, or e-money institutions; consequently, the issuance of many cryptocurrencies is not currently regulated. Cryptos are ordinarily issued and guaranteed by algorithmic rules defined by its protocols.

2. Tokens

A token is a representation of another entity or asset. That asset is tokenised and is represented as a token within a particular ecosystem. A token can represent an asset, utility, service, right, or anything. According to Ernst & Young, a token tends to be designed to support a more narrowly defined, specific use case of distributed ledger technology[25]. A token is not limited to one particular role; it can fulfil a lot of roles in its native ecosystem. Tokens typically exist on top of an existing smart contract platform, like Ethereum. Tokens can take the following forms:

2a) Security Tokens

PwC define security tokens as "digital tokens based on blockchain technology that are similar in nature to traditional securities. They can provide an economic stake in a legal entity: sometimes a right to receive cash or another financial asset, which might be discretionary or mandatory; sometimes the ability to vote in company decisions and/or a residual interest in the entity"[27].

The US Securities and Exchange Commission wanted a clear test to identify tokens as securities. The most common method to differentiate securities from utility tokens is by using *The Howey Test*. This test refers to a 1946 US Supreme Court case involving the Howey Company of Florida. In brief, the company decided to lease half of its property to speculators based on the assumption that it would generate profit for them as a result of someone else's labour, but failed to register the transactions with the US Securities and Exchange Commission (SEC). When the case finally arrived at the Supreme Court, it was deemed unprecedented and required a new method to assess what constitutes a security. Hence, The Howey Test came into fruition. According to the test, a transaction is considered a security if it meets the following criteria:

1. It is an investment of money.
2. The investment is in a common enterprise.
3. There is an expectation of profit from the work of the promoters or the third party.

A token that passes the Howey Test is treated as a security token in the US. Security tokens are subject to federal securities and regulations since they derive their value from external, tradable assets.

Industry experts differentiate between security tokens and tokenized securities. The critical difference between the two is that security tokens are newly-issued securities that function on a distributed ledger, while tokenized securities are just token representations of already existing financial products. Thus, if an investor has an ownership interest in a new financial

product with security features, it is a security token. If an investor takes an existing asset and wraps it in a token, it is a tokenized security[28].

2b) Utility Tokens

Utility tokens are digital tokens functioning within a blockchain that provide users with access to a product or service and derive their value from that right. Utility tokens give holders no ownership in a company's platform or assets and, although they might be traded between holders, they are not primarily used as a medium of exchange. These tokens are usually created with a specific purpose in mind, bespoke to the project that issues them. They can be exchanged for specific services such as distributed storage, in-app currency, or for more operational purposes. The value of these tokens is usually based on their expected use in the project for which they were intended. Another way to understand them is to consider them as gateway tokens which:

- Give holders a right to use the network
- Give holders a right to take advantage of the network by voting.[29]

2c) Asset-backed tokens

According to PwC, an asset-backed token is "a digital token based on blockchain technology that signifies and derives its value from something that does not exist on the blockchain but instead is a representation of ownership of a physical asset (for example, natural resources such as gold or oil)"[27].

2d) Governance tokens

Governance tokens grant their holders governing rights on a protocol. As decentralised protocols increase, the need to grant decision-making processes to users increases. Governance tokens allow stakeholders to collaborate, coordinate, and vote how the network is managed. These tokens fuel blockchain-based voting systems. As an example, for the Maker Protocol, the governance token is MKR.

2e) Platform tokens

Some industry experts have coined the term platform tokens for tokens used as fuel or gas on a network. For example, Ether (ETH) is used to fuel transactions on the Ethereum network. Tokens can be built on Ethereum, but Ether is still required to send a token. It funds the mining costs (it pays the computers that verify transactions on the Ethereum network). Since these tokens fuel the operations of the platform and network, they are referred to as platform tokens.

2f) Hybrid tokens

Some tokens have dual or triple use cases and can have multiple benefits. For example, NEO is staked in a wallet to earn a dividend. This dividend is known as GAS. Tokens can be built on NEO, just like they can on Ethereum. When sending a token on the NEO network, you need to pay GAS as a transaction fee, the same way that Ether is used to pay Ethereum fees. Similarly, Dash (DASH) allows users to vote on important decisions for the Dash network. If there is an idea suggested to upgrade the DASH network, those holding enough Dash can vote to decide whether the upgrade should happen. These voting rights allow the holders of DASH to have a say in how the project evolves.

Different Types of Tradeable Goods in Sharia

Traded items fall into one of the following:

1. *Māl* (property)
2. *Manfa'ah* (usufruct)
3. *Haqq* (right)
4. *Dayn* (debt)
5. None of the above

If we consider the understanding of Hanafi jurists, the main differences between the above is: *Māl* is that which people have an inclination to and is storable, retrievable for future use. The benefits derived from *Māl* are regarded as *Manfa'ah*. The *Manfa'ah* is derived from *Māl* based on the utility provided by the *Māl*. A *Haqq* gives right to *Māl*, *Manfa'ah,* or *Dayn*. A *Haqq* is a means and not an end; it is an intermediary to something. *Haqq* permits you to do something. *Dayn* is a liability and debt owed to another which rests on a person's *dhimmah* (individual's legal personality).

When the term *Haqq* is used, attention is paid to the person who is entitled to it and the right due. In the case of *Manfa'ah*, attention is paid to the benefit received. A car is *Māl*, riding in a car is the benefit (*Manfa'ah*) which is derived from using the car, while the capability and authority of riding in a car is a *Haqq* (right) which is conferred to the person who is entitled to it.

1. Māl

Linguistically, *Māl* in the Arabic language refers to anything which can be acquired and possessed; whether it is corporeal and tangible ('*ayn*) or intangible. Examples of this include gold, silver, animals, or plants[30]. After the codification of Islamic law, the term *Māl* was coined to denote different technical meanings and concepts. Thus, jurists from different schools differed in their understanding of *Māl*. The Hanafi jurists have differed from the

majority in their understanding of *Māl* - some of the common definitions among the Hanafi jurists are:

- *Māl* is what human nature is inclined to and is capable of being stored for the time of necessity.
- *Māl* is anything that is beneficial for human beings[31].
- *Māl* is that which is normally desired and can be retrieved in the time of need[32].

The definitions denote that the two key criteria for defining *Māl,* in the Hanafis' view, are "desirability" and “storability”. Although some Hanafi jurists have stated that *Māl* must be a physical entity, Mufti Muhammad Taqi Uthmani dispels this argument and states that the Qur’an and Sunnah have not explicitly defined *Māl*. Rather, Sharia has left it to the understanding of people. Furthermore, he argues that there is legal precedent in the Hanafi school to describe intangibles as *Māl*.

The Shafi’i jurists have included usufruct in the definition of *Māl*. Imam al-Zarkashi states that, "*Māl* is what gives benefit, i.e. prepared to give benefit"; he continues to say that *Māl* can be material objects or usufructs[33]. Imam al-Suyuti 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.”

From among the Hanbali jurists, Imam al-Kharqi states that *Māl* is that which serves a lawful benefit. Imam al-Buhuti elaborates on this definition and states that anything bereft of benefit, such as insects, or unlawful benefit, such as wine, cannot be considered as *Māl*.

Only that which is *Māl* and has *Taqawwum* can be traded by Muslims. *Taqawwum* means that the item should be lawful in Sharia. Only lawful items have a recognised value in an Islamic framework. Therefore, Ali Haydar states that the criteria for any item to be tradeable and exchangeable are:

1. *Tamawwul*
2. *Taqawwum*

Tamawwul refers to something being used and benefited from as due to it the benefits that are derived from it. *Taqawwum* refers to the item being lawful. The Islamic scholars state that a single grain of wheat is not *Māl* without the *Tamawwul* of people. This shows that although a grain of wheat is existing - it is tangible, visible, and storable - the Islamic scholars negated it from being *Māl* unless there is *Tamawwul*. *Tamawwul* for the grain of wheat would be the use and derivation of a reasonable and sensible benefit from this single grain of wheat.

2. *Manfa'ah* (usufruct)

The Hanafi jurists have differed in their understanding of *Manfa'ah*. Hanafi legal theory does not recognise *Manfa'ah* as *Māl*. They argue that usufruct is not something that exists independently; it is only derived with use and consumption of *Māl*. Hence, *Manfa'ah* have the following characteristics which distinguish it from *Māl*:

a) Intangibility

Manfa'ah cannot be stored. *Manfa'ah* is derived and consumed from the use of something.

b) Variability

There will be variability in each service, even if minute. 100% consistency in the quality of a service to the consumer is not guaranteed.

c) Inseparability

The service provision and service provider are inseparable. The service provision and service receipt take place simultaneously. For example, a tenant receives the benefit of living in a house simultaneously to the leased asset providing the benefit.

The majority of jurists from beyond the Hanafi school have defined *Manfa'ah* as *Māl*. They argue that usufruct is the objective of property. In addition, in an *Ijarah* (lease), *Manfa'ah* is considered as *Māl* when in lieu of consideration.

3. Haqq

The term '*Haqq'* is a broad concept which incorporates property rights (*Haqq Mālī)* and non-property rights[34]. A *Haqq Mālī* is that right which is connected to property (*Māl*), usufruct (*Manfa'ah*), or debt (*Dayn*). There are two types of *Haqq Mālī*:

a) *al-Haqq al-Shakhsi* (personal right)
b) *al-Haqq al-'Ayni* (real right)

Al-Haqq al-Shakhsi is that right which emanates as a result of a contractual relationship between counterparties, whereby one has an obligation to perform in favour of the other. Hence, the right is due to another person. This is also referred to as *iltizam* in Islamic law.

Al-Haqq al-'Ayni refers to the right in relation to an item or service. This incorporates the classical rights discussed by the jurists such as the right of passage (*ḥaqq al-murūr*), the right to flow of water (*ḥaqq al-Tasyil*), the right to water (*ḥaqq al-shirb*), etc. Such rights as these

are referred to by Mufti Muhammad Taqi Uthmani as *al-Huquq al-'Urfiyyah* (customary rights).

As opposed to *al-Huquq al-'Urfiyyah*, rights granted by the Sharia which are not the result of analogical reasoning (*Qiyas*) and custom ('*Urf*) are known as *al-Huquq al-Shar'iyyah* (Islamic legal rights). Such rights cannot be traded. Examples of such rights are: *Haqq al-Shuf'a* (right of pre-emption), *Haqq al-Wirāthah* (right to inherit), *Haqq al-Qiṣāṣ* (right of retribution), and *Haqq al-Talāq* (right to divorce). *Huquq al-Shari'yyah* comprise of rights which are established explicitly in Sharia to ward off harm or to grant a benefit to a specific person. These rights are specific to the person due to the specific circumstances of that individual. As a result, these *Huquq* are specific to the right holder and cannot be transferred in lieu of a payment[31].

Rights which are not primarily granted by Sharia but are based on custom and practice are regarded as *al-Huquq al-'Urfiyyah* (customary rights). These are determined by the practice and understanding of people. The ruling of all such rights are based on customary practice ('*Urf)*. Those rights which are not traded are not considered to be *Māl*. As a result, they do not possess the economic value which warrants consideration. The jurists only permit a fee for relinquishing (*Tanāzul*) such rights and not a fee to sell. Because the right is not *Māl*, the right cannot transfer to another party in lieu of a fee; instead, the right holder will be merely relinquishing and waiving their right. Rights which have a customary economic value and are sought by people are *Māl*, based on the customary practice. Many such rights today are documented, registered, and legally recognised as assets. As a result, they are easily tradable[31].

Crypto-assets from an Islamic Finance Perspective

As indicated above, an asset can only be tradeable if it primarily has the following two features:

1. *Māl*
2. *Taqawwum*

If we consider crypto-assets, they are clearly retrievable by existing in a digital space within e-wallets. Their existence is evidenced by the ability to use the tokens when the owner wishes. Furthermore, many tokens grant Sharia-compliant services. For example, some tokens are a tokenisation of a Halal asset, others grant utility and access to services, and others are accepted as a means of exchange. As such, crypto-assets are clearly *Māl* as humans are inclined toward them, they do have benefits, and they are retrievable and usable when the owner requires. Many crypto-assets also have *Taqawwum,* as the use cases of such tokens are Sharia-compliant.

The Crypto Junk

According to CoinMarketCap's data, there are nearly 20,000 cryptos in circulation and 527 exchanges. Based on this data, an average of 22 cryptocurrencies entered the market daily in 2022. Many of the crypto-assets that are being released seem to be emulating established crypto-assets such as Bitcoin and Ethereum, with a few cosmetical changes. A lack of regulation, abundance of jargon, information asymmetry between various stakeholders, artificial hype and greed has resulted in a perfect storm in the crypto-verse.

From a Sharia perspective, there seems to be sufficient room and a baseline to allow experimentation and ideation with crypto-assets. Experimentation allows growth and the best ideas to rise to the top in an unmanipulated market with low barriers to entry. Of course, the increased scams and dubious practices are all impermissible. These are practices of people and not inherent to only crypto-assets. The same manipulation, fraud and deception has been practiced across the spectrum of assets. Thus, these are extrinsic matters to crypto-assets. But intrinsically, there is room to test and sandbox crypto-assets on a very foundational Islamic legal maxim, which states:

"Permissibility is the state of all things by default."

With other criteria being met, such as qualifying as valid property and wealth (*Maliyyah*) in Sharia, lawful operations and use cases, and a Halal ecosystem, some tokens can be deemed acceptable when they authentically serve a utility and purpose. They may be a means of governance and voting on a blockchain, designed to add value to people's lives and actually solve a problem that exists, not just a hypothetical problem. Similarly, they may function as utility tokens which genuinely provide utility. Or they may be tokenised assets that facilitate investments, markets and liquidity.

What is questionable and borderline junk are the many tokens which are issued, launched as 'currencies' and sold to people. From a Sharia perspective, something does not become a currency by a company or bedroom programmer simply issuing it as one and people buying it in hype. A currency needs to become a 'currency'; something which people agree and use as a payment mechanism and as a medium of exchange. As such, there is an argument that can be made whether the plethora of junk tokens that have been released as 'currencies' are even currencies. Whether trading on exchanges purely to make a quick profit from the price fluctuations of such coins and mere speculation because of FOMO qualify as social acceptance of it being a currency, is highly debatable and I am more inclined to it not being so. I mean, you cannot have 15,000 coins all being currency, and all trying to solve the same problem at once, many will not be doing anything at all!

Currency plays a role as a medium of exchange, and a medium of exchange entails that currency is a 'bridge asset' to solve the issues caused by the barter system. Currency results in

an indirect exchange; where people are happy to exchange their sale item with this currency, to then exchange the currency they have received with another sale item they desire, thereby side-stepping a direct barter trade. That is why it is called a 'medium'. Money is a bridge and the 'middleman' to solve the issues that manifest in a barter system.

The so-called 'coins', or junk coins which neither serve as a true and genuine medium of exchange by being accepted in lieu of real goods and services and are only traded on crypto exchanges, are questionable from a Sharia compliance perspective. What do they actually represent? Do they have any substance? Are they serving as a medium between goods and services, or only betted and speculated upon? If they are not valid currencies from a Sharia perspective, they are digital junk and digital waste. The illustrious Imam of the Hanafi school, Imam Muhammad al-Hasan al-Shaybani (d.189 AH) states that for something to be considered as currency, there must be widespread acceptance of it being a medium of exchange. If it does not reach a critical mass, it cannot be deemed a currency. If a token is purely designed to serve as a medium of exchange and is not serving as a medium of exchange as described by the Islamic jurists, then it will not be a valid asset from a Sharia perspective as it serves no purpose whatsoever.

Being a medium of exchange is central to currencies. Saifedean Ammous states:

"Being a medium of exchange is the quintessential function that defines money—in other words, it is a good purchased not to be consumed (a consumption good), nor to be employed in the production of other goods (an investment, or capital good), but primarily for the sake of being exchanged for other goods."

It is among the primary principles of Sharia that only an asset that has a bona fide benefit and utility is traded. The Maliki scholar Imam Ibn al-Arabi (rahimahullah) mentions that an asset worthy of transacting and trading is that asset which people genuinely aspire, which is capable of being used for a genuine purpose and it is lawful to use from a Sharia perspective. The Shafi'i Imam al-Zarkashi (rahimahullah) states that an asset in Sharia is that which has utility and benefit. The illustrious Hanafi jurist Ibn Nujaym (rahimahullah) quoting from al-Hawi al-Qudsi states a similar principle that assets have been created for the benefit of mankind. The great Hanbali jurist Imam al-Mardawi (rahimahullah) states that assets that are lawful in Islam are those which have a Sharia compliant and valid use case. These descriptions stem from a Sharia concept known as *Mal*. *Mal* is that thing which people incline towards. Generally, reasonable people are only inclined towards something when they perceive a benefit therein. And that is the essence of *Mal*, something that benefits. Anything that is beneficial and has a clear, Halal utility is Sharia compliant. Anything that doesn't have a utility or does not have a Halal benefit, then it is not Sharia compliant.

The reason for this Sharia requirement is that Islam sees a transaction to be one where both parties are equal and have a level-playing field. As such, both parties should gain and benefit

from a bargain and transaction. When one party is paying money or giving something of value with a clear use case, the counterparty must also deliver something of equal nature i.e. possessing value with utility and a clear use case. Furthermore, Sharia doesn't recognise an asset that has no reasonable utility as a valid subject matter of the sale. The wisdom of that is clear, which is to prevent people from selling all crazy and useless items to those who are naive, gullible and not aware of what is going on. These principles safeguard and protect consumers from deception and being taken advantage of. The essence of Sharia is to establish that which is beneficial and prevent that which is harmful.

That which is artificial and inflated by hype can never survive. It is the system of Allah that harm and negative forces will always be flushed out sooner or later. He states a parable indicating to this phenomenon:

"He sends water from the sky that fills riverbeds to overflowing, each according to its measure. The stream carries on its surface a growing layer of froth, like the froth that appears when people melt metals in the fire to make ornaments and tools: in this way God illustrates truth and falsehood- the froth disappears, but what is of benefit to man stays behind- this is how God narrates parables." [Qur'an 13:17]

Thus, market corrections occur, where the misallocation of capital is rectified. The rubbish is flushed out and that with a solid proposition and benefit remains. Generally, the purification leaves that which has long-term benefit and genuine utility.

Crypto-Offerings

Crypto-assets can be acquired through fundraising mechanisms by the crypto-projects themselves or purchased in the secondary market on exchanges. Crypto-assets are offered through different types of fundraising events such as:

1. Initial Coin Offerings
2. Security Token Offerings
3. Initial Exchange Offerings

Initial Coin Offerings (ICOs)

An Initial Coin Offering (ICO) is a method of raising funds through the use of cryptocurrencies. ICOs are basically crowd sales, the cryptocurrency version of crowdfunding. ICOs are commonly contrasted to Initial Public Offerings (IPOs) due to the commonality of wanting to raise funds through offering and issuing something. However, this comparison is quite deceptive and inaccurate. IPOs usually apply to established businesses that sell partial ownership of shares in their company or issue new shares altogether as a way to raise funds. In contrast, ICOs are mainly used as a fundraising mechanism that allows companies to raise

funds for their project in very early stages[35]. Before an ICO, a company charts out their project, vision, token, and their minimum viable product (MVP) in a whitepaper. Companies usually create a token on the Ethereum blockchain based on the ERC-20 token standard. A company can use the Ethereum smart contracts to create and issue their own token. The ERC-20 protocol defines a set of rules that the company must adopt if they want to issue a token on the Ethereum blockchain.

Stages in an ICO

An ICO typically goes through the following stages[36]:

1. Conception

This is the brainstorming phase, where the idea is worked upon to develop a minimum viable product. This stage involves creating the concept for the project. A whitepaper is usually drafted to capture the value-adding elements of the project.

2. Pre-sale announcement

The pre-sale announcement is an early announcement about the procedure and project that ignites the interest of the investors. During this phase, the ICO development company gives a presentation and executive summary of the project that explains its vision and mission.

3. Technical development

In this phase, the technical development of the token and the token management system take place.

4. Marketing stage

A huge PR campaign begins on social media, as well as appearances at crypto events, to sell the concept of the project.

5. Final stage

The final stage is the token sales. There are different types of sale rounds that occur, such as[37]:

a. Private Sale: This is the first investment proposal. Announcements are made on the terms of the idea and implementation, the necessary amount of coins, and token emission. To do this, a special site or presentation is published. Often there is a preliminary closed token sale

allowing collection for the official launch. At this stage, tokens can be bought at a maximum discount and bonuses (sometimes up to 50%), as well as on more flexible terms.

b. Pre-ICO or Pre-Sale: The fundraising before the ICO for its realisation. During the Pre-Sale, the cost of tokens is traditionally lower than at the ICO, but higher than at the Private Sale. Investors receive bonuses and discounts. Many investors consider this stage to be potentially most profitable. They buy tokens at a low cost, then sell them as soon as the they start trading on exchanges. This is a form of short-term investment.

c. Token sale start (crowd sale): The main stage of the token sale, the ICO itself. Initially, the start-up offers investors the ability to purchase tokens at their platform (website). Later, sales are launched on the publicly available crypto-exchanges. The release of the ICO start-up tokens on the exchange is considered to be certain proof of the solvency of the project, but it does not guarantee its success in the long-term.

Security Token Offerings

A security is an economic instrument representing an actual asset. Stocks, bonds, and managed property trusts are examples of securities. Traditionally, when a security is purchased the operation is done the old-fashioned way: on paper. A security token performs equally in functionality; the difference is that it confirms ownership through blockchain transactions. Security tokens offer a number of financial rights to investors such as equity, profit dividends, income shares, vote casting, and access to many others investment mechanisms[38]. At the heart of an STO are security tokens. The Financial Conduct Authority (FCA) in the UK describes security tokens in the following manner:

"Security tokens are those tokens that meet the definition of a Specified Investment as set out in the Regulated Activities Order, and possibly also a Financial Instrument under MiFID II. For example, these tokens have characteristics which mean they are the same as or akin to traditional instruments like shares, debentures or units in a collective investment scheme. Security tokens include tokens that grant holders some, or all, of the rights conferred on shareholders or debt-holders, as well as those tokens that give rights to other tokens that are themselves Specified Investments. We consider a security to refer broadly to an instrument (i.e. a record, whether written or not) which indicates an ownership position in an entity, a creditor relationship with an entity, or other rights to ownership or profit. Security tokens are securities because they grant certain rights associated with traditional securities."

A security token is essentially an investment contract into an underlying asset; it has all the attributes of a security in that it is a fungible, negotiable financial instrument that represents actual monetary value. STOs are backed by real assets and follow the SEC's guidance on compliance, issuance, and trading. The STO is an attempt by founders to issue a token offering that remains compliant with legislation, depending on the specific geographies from

which it is taking investment. This may mean registering the STO with local regulators as a securities offering.

In contrast with an ICO, an STO investor is assured that they are buying equity, debt, derivative, certificate of interest, or a participation of any profit-sharing organisation. While this is no guarantee of profit by itself, it's comparable to buying stock in a publicly traded company. If the project returns a profit, the investor has a legitimate claim on their share of those returns. An STO isn't necessarily just for a start-up, either. An already-established company could use an STO to issue digital tokens against existing equity instruments, for example, to raise funds for a new product or business line. Whereas the secondary markets for ICO tokens are largely unregulated cryptocurrency exchanges, STO tokens are traded on fully regulated trading platforms[39].

Initial Exchange Offerings (IEO)

An Initial Exchange Offering, commonly referred to as an IEO, is a fundraising event that is administered by an exchange. In contrast to an Initial Coin Offering (ICO) where the project team themselves conduct the fundraising, an Initial Exchange Offering means that the fundraising will be conducted on a well-known exchange's fundraising platform, such as Binance Launchpad, where users can directly purchase tokens with funds from their own exchange wallet.

For a user, an IEO is easy to participate in as they don't need to manage on-chain transactions with different wallets on different blockchains. Instead, a user only needs an account on the exchange and some funds in their account; they can then completely participate through the trusted website's interface. Additionally, the exchange is staking its reputation behind the projects on its platform, offering a higher degree of trust behind the project.
For a project looking to raise funds, an IEO offers the promise of an immediate userbase that can see their product. Depending on the size of the exchange's audience, this could mean that the project can reduce their outside marketing funnels for fundraising, allowing them to focus only on the development of their product[40].

Since ICOs are unregulated and most of them turned out to be scams, STOs were supposed to be a fix. However, most STOs remain constrained by slow and expensive processes and stifling regulations. IEOs are the middle ground that address issues on both sides.

Essentially, IEOs are another way to crowdfund various crypto-asset start-ups through a crypto-exchange acting as a mediator. With the help of a crypto-exchange, projects manage to get significantly more exposure, interest, and credibility. After a successful IEO, the token issuers pay a listing fee along with an agreed number of tokens for the use of IEO platform

services. Soon, the tokens are listed on the exchange where investors can access instant liquidity[41].

The Areas of Debate for Crypto-Assets

Upon examining various Fatawa and opinions voiced on crypto-assets, we can identify two main areas of dispute:

a. inherent aspects
b. external aspects

Inherent aspects pertain to the core essence, functions, and features of crypto-assets, while external aspects involve matters of security, governance, fraudulent use, speculation and potential risks or harm to individuals.

In relation to the inherent aspects, they consist of:

a. Existence

   A relatively small proportion of scholars voice whether anything is in existence in the first place in crypto-assets. They question whether they exist in reality because they are purely digital creations without any physical presence. Unlike tangible assets such as gold, real estate, or commodities, cryptocurrencies like Bitcoin and Ethereum have no inherent material value. They are simply a collection of data stored on a decentralised network of computers, represented by unique strings of numbers and letters. This intangible nature has led some to question the legitimacy and real-world existence of crypto assets, as they lack the traditional characteristics of tangible assets. Moreover, the value of crypto assets is determined primarily by the forces of supply and demand, as well as by the perception of their worth by market participants. This reliance on perception and consensus could be seen as further evidence that crypto assets do not exist in reality, as their value is not intrinsically tied to a physical asset or backed by a government.

   Scholars who argue that crypto-assets do exist and are recognised property debate that they do exist, albeit in a digital form. The fact that cryptocurrencies are intangible does not negate their existence; rather, it reflects the evolution of assets in the digital age. The internet, for example, is also an intangible construct, yet it is undeniably real and has transformed the way we live, work, and communicate. From a Fiqh perspective, it is perhaps flawed to apply the same criteria for tangible assets to that to digital assets. Just like the rulings for immoveable assets and moveable assets are different because of their states, digital and non-digital assets cannot be treated the same.

Crypto assets derive their value from the underlying blockchain technology, which enables secure, transparent, and decentralized transactions. These transactions are recorded on a public ledger, providing a level of trust and authenticity that rivals traditional financial systems. Furthermore, the limited supply of certain crypto-assets, such as Bitcoin, creates scarcity, which can drive value and support the notion that these digital assets do exist in reality.

Additionally, crypto assets have gained acceptance as a form of payment in various industries and are recognized by several governments and financial institutions worldwide. This widespread recognition and usage indicate that crypto assets, though digital and intangible, do exist in reality, as they have real-world applications and impact.

b. Sharia-recognised Property

This argument and concern are raised in simultaneously with the first point, that even if there is something existence through digital means, it is not valid and Sharia-recognised property.

Although some classical Hanafi jurists have stated that *Māl* must be a physical entity, Mufti Taqi Uthmani dispels this argument and states that the Quran and Sunnah have not explicitly defined *Māl*, rather, Sharia 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 late Hanafi jurists which consider electricity and gas as *Māl* despite being intangible. Thus, intangibles can also be *Māl* on condition they are desirable and retrievable. It is not necessary for intangible *Māl* to remain after using, 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.

In relation to the external aspects, they consist of:

a. Government-issued payment system

Government approval for crypto-assets is a primary concern raised by several scholars, and that is understandable to protect the interests of people. The calls for governance are even louder for those crypto-assets being positioned as potential means of payment. Dr Abdus Sattar Abu Ghuddah (Rahimahullah) explicitly states that setting monetary policy and determining currency is a core function and role of the government. He mentions that every state had a minting house called *Dar al-Darb*. Any person who had gold or silver, could not coin the metals into currency on his own accord. He would have to take it to the authorities who would mint the coins.

Such practices are underpinned with the principle of *Maslaha* (public interest and benefit) he argues, which is best served by giving the authorities this function. Thus, he concludes that it is the government alone who has the authority to introduce a currency. Any unofficial currency cannot be deemed currency even though it may be used as a currency.

Dr Abdus Sattar highlights a key point in this entire discourse by stating that this issue is underpinned by the principle of *Maslaha*. Islam has given us a system which advocates all practices to preserve the wealth of people. A system which destroys the wealth of people and puts it at severe risk, fails to comply with the Maqasid al-Sharia.

What needs to be considered to navigate these concerns is to address what level of authority or type of authority is required from a Sharia perspective for the *Maslaha* to be achieved? is it crucial for authority to be vested in a body of people or can a non-human system have vested authority? In other words, is the goal an actual group of people with control or a system with control? Are the teachings of Islam centred on a governing body of people or simply a system of governance? Can blockchain facilitate that governance.

Until the caliphate of Abdul Malik ibn Marwān, the Islamic government did not control the currency nor its coinage. The Islamic government did not have a 'Royal Mint', however, Sayyiduna 'Umar ibn al-Khaṭṭāb *raḍiyallahu 'anhu* did introduce some measures to stabilise the alloy, content and weight of silver coins. In the year 74 AH, the government of Abdul Malik ibn Marwān centralised monetary governance and an Islamic dirham. Minting houses were established, taking control of money circulation, quality, and purity of currencies. The Hanafi jurists argue that customary usage (*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 a known point of reference, thus, creating ease in the markets and facilitating transactions.

The Shafi'ī jurists state that it is disliked for other than the government to mint coins and currency as it was the role of the government and there is always a risk of counterfeiting, forgery and corruption. A governing body would be most effective in preventing malpractice.

The Hanbali jurists are explicit in stating that it is not permissible for the Sultan 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. Considering the benefit and harm for the masses, Imam al-Ṣuyūṭī (d. 911 H) also states that it is disliked for the government to withdraw or nullify a currency commonly used among people.

Al-Buhuti (d.1051 H) 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 the above precedents, it is clear that a governing body was favoured as it is in the interests of the people to have an authoritative body preventing fraud, corruption, and monetary malpractices. The government and ruling authority would have been the most efficient and instrumental in achieving these ideals. It is on the back of this 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 (d.728 H). This is a common feature for those aspects of law which are fluid, dynamic and adjustable. The Hanafi legal school asserts that currency is that which people deem by common usage and social congruence. [Bada'i al-Sana'i] Imam Ahmad (d.241 H) also opined that that it is acceptable for the people to agree upon something as currency. [al-Mughni]

Considering that a centralised system is not necessary, Shaykh Abdullah al-Mani' states:
"Currency is whatever is agreed upon, whether by government authority or public practice".

Since this is all based on 'Urf and customary practice, currency and payment systems can develop in two ways:

1. Organic – this will develop over time as the market's medium of exchange based on the desirable characteristics of the medium of exchange. In historical times, something became the medium of exchange organically with time, due to an asset's efficiency, stability, divisibility, scarcity and portability. This monetary order came into existence after many transactions and market engagements. It is not something that transpires as a result of academic debate or rational planning. It is the market and the people, when left free, agree by practice and action on what works best for them. And it is for this very reason that the classical scholars also left it to the people. The fittest medium always wins in a free market.

2. Declared by government – this will instantaneously be the market's medium of exchange.

b. Governance

The lack of regulation or the slow development of regulation is another external and extrinsic issue raised against crypto assets. Some scholars state that one should avoid dealing with crypto-assets due to the lack of governance, regulation and oversight.

c. Speculation

Speculation is the act of taking a view on the potential price of an investment. It involves making an educated guess on how the market will move and placing a bet on that outcome. However, many people view speculation as something that is risky and only done by high-risk investors. The reality is that every investment involves some level of speculation. Whether it's buying stocks, real estate, or commodities, investors are always making predictions about the future value of their investment. Even those who invest in low-risk assets like bonds or savings accounts are still speculating on the interest rates that will be paid out in the future.

From the above reality of speculation, speculation is not Gharar. Linguistically, Gharar refers to the situation wherein one exposes their wealth and property to damage and ruin without being aware of it. Technically, Gharar refers to any instance where the fulfilment of the terms and conditions of a contract of exchange are contingent or uncertain.

Sayyiduna Abu Hurayra narrated: "The Messenger of Allah ﷺ prohibited the Gharar transaction." [Tirmidhi]

Gharar is prohibited to:

- protect businesses against adverse outcomes.
- prevent disputes in the society which generate from business transactions.
- ensure transparency in contracts.
- mitigate asymmetrical risk where one party is exposed to more unjustified risk than the other.

Examples of Gharar include:

- Uncertainty in the existence of what you are selling.
- Uncertainty in the delivery of an item because you don't have the item in your control or possession.
- Uncertainty in the quantity of the sale item and it being subject to change.
- Uncertainty in the timeframes to deliver the obligations in the agreement.

Thus, merely investing in assets which are volatile is not in and of itself a Sharia issue. If volatility was a key reason to prohibit investments, private equity and early-staged business investments ought to be prohibited. According to data from the Bureau of Labor Statistics, as reported by Fundera, approximately 20 percent of small businesses fail within the first year. By the end of the second year, 30 percent of businesses will have failed. By the end of the fifth year, about half will have failed. And by the end of the decade, only 30 percent of businesses will remain — a 70 percent failure rate. If we go by such numbers, it is highly likely that the majority of businesses will fail. Is such a speculative task then prohibited? Another example is that of private equity investments. The failure rate of private equity investments varies depending on the type and stage of the investment. For venture-backed companies, which are typically early-stage start-ups, some studies show that as many as 75 percent never return cash to investors, with 30 to 40 percent of those liquidating assets where investors lose all of their money. For buyout deals, which are usually more mature and established companies, some reports suggest that the average buyout performance has been on a downward trend for the past three decades, dropping by six percentage points between 1999 and 2019. Again, this is not sufficient to deem something as prohibited.

Yes, speculating or shall we say investing, will be a concern from a Sharia perspective when a person is not fulfilling their financial obligations to their dependents or not fulfilling other Sharia obligations. Such a speculative investment will be severely disliked and potentially prohibited for that individual.

d. Illegal use – another extrinsic argument by scholars is how entities are using crypto-assets for illegal activities such as for money laundering, drug trafficking, and other illicit activities.

   However, from a Sharia perspective, the ruling of an asset which can be used in multiple ways and is dependent on the user cannot be deemed as impermissible in and of itself; it is the *user's activity* which is problematic. Like any other tool or technology, it can be used for both legitimate and illegitimate purposes. Furthermore, fiat currencies, which are issued and controlled by governments, have also been used for illegal activities such as drug trafficking, money laundering, and financing terrorism. However, this does not mean that we should ban fiat currencies altogether. Thus, this does not seem like a strong argument either. It would perhaps be more reasonable and productive to focus on improving their regulation and oversight to prevent illegal activities. This includes developing mechanisms to reduce illegal activity, implementing Know Your Customer (KYC) and Anti-Money Laundering (AML) measures, and enforcing measures against those who engage in illegal activities using cryptocurrencies.

Views of Contemporary Scholars

Contemporary scholars are split into two different views on the Sharia compliance of crypto-assets. The varying views can be summarised into the following:

Opinion 1: Not Sharia-compliant

Scholars of this view argue that crypto-assets are not Sharia-compliant. This group of scholars raise various arguments as discussed previously, including a lack of existence, no governance, security risks, speculative behaviour and crypto-assets themselves not being *Māl*.

Opinion 2: Sharia compliance is subject to screening

Scholars of this view agree that crypto-assets can be *Māl*, meaning they acknowledge the existence of something digitally. They can gauge the effects and consequences of using crypto-assets; as such, there must be something there for it to have an impact and a causal relationship for a given output. They argue that to deny the existence of crypto-assets is inaccurate; existence in a digital network cannot be quantified or qualified with the same metrics as that of physical entities. Classical Islamic scholars frequently apply a 'litmus test' by evaluating the consequences and outcomes of something to understand the reality of that thing before developing a Sharia ruling. Many crypto-assets clearly have utility. These tokens can give the owners the right to 'something', varying from a licence or access to social media to downright electricity or water. Any sort of value can be attached to a token. Therefore, it is very difficult to argue the non-existence of crypto-assets. Having a lawful utility is sufficient to regard something as *Māl*. As such, crypto-assets which have a lawful utility are *Māl*. However, given the various types of crypto-assets, these scholars call for screening and review of crypto-assets just as other investments are screened.

The Resolution of the Securities Commission Malaysia

It interesting to note that the Sharia Advisory Council of the Securities Commission Malaysia issued the following resolution:

"Digital assets as regulated under the jurisdiction of Securities Commission Malaysia (SC) consist of digital currency and digital token (Digital Assets). The definition and scope of digital currency and digital token which were defined as securities are as prescribed under the Capital Markets and Services (Prescription of Securities) (Digital Currency and Digital Token) Order 2019.2 Several issues from Sharia perspective in relation to Digital Assets were presented to the Sharia Advisory Council of SC (SAC).

Issue

Since there are Digital Assets which are categorised as capital market instruments, the SAC had discussed the following issues from Sharia perspective:
(i) Whether Digital Assets can be recognised as Māl (asset) from Sharia perspective?
(ii) Whether Digital Assets can be classified as currency or 'urudh (goods)?; and
(iii) How to determine the Sharia status of a digital token?

Resolution

SAC in a series of its meetings had discussed issues in relation to Digital Assets from Sharia perspective. The discussions on Digital Assets in the SAC meetings are limited to Digital Assets that are regulated by the SC. The SAC had, at its 233rd meeting held on 29 June 2020 and its 234th meeting held on 20 July 2020, resolved the following:

(A) Digital Currency

Digital currency is recognised as *Māl* from Sharia perspective. The SAC had viewed digital currency from two scopes, as follows:

(1) Digital currency that is based on technology without any underlying

Digital currency in this form is categorised as *`Urudh* and it is not a currency from Sharia perspective. Such digital currency is not categorised as *Ribāwi* items. Therefore, the trading of such digital currency is not subject to the principle of *bai` al-sarf* (currency exchange).

(2) Digital currency that is backed by *Ribāwi* items

(i) Digital currency that is backed by gold, silver and currency

If a digital currency is backed by *Ribāwi* items comprising gold, silver and currency, it is categorised as a currency from Sharia perspective. Hence, the trading of such digital currency is subject to the principle of bai` al-sarf.

(ii) Digital currency that is backed by *Ribāwi* items other than gold, silver and currency

If a digital currency is backed by *Ribāwi* items other than gold, silver and currency, it is categorised as *amwal Ribāwiyyah* (*Ribāwi* items). Therefore, the trading of such digital currency is subject to the Sharia requirements of Ribāwi items.

(B) Digital Token

Digital token is recognised as *Māl* under the category of `*Urudh* from Sharia perspective. In determining the Sharia status of a digital token, the following matters must be fulfilled:

(i) The proceeds raised from the issuance of the digital token must be utilised for Sharia-compliant purposes;

(ii) The rights and benefits attached to the digital token must be Sharia-compliant; and

(iii) In the event that the utilisation of proceeds under item (i) and the entitlement of rights and benefits under item (ii) above are for mixed activities of Sharia compliant and Sharia non-compliant purposes, the existing SAC resolution on utilisation of sukuk proceeds and the business activities benchmark under the Sharia screening methodology for listed companies on Bursa Malaysia are applicable.

If a digital token is backed by *Ribāwi* items, the trading of such digital token is subject to the Sharia requirements for trading of *Ribāwi* items. This resolution is not applicable to any Digital Assets which are outside the jurisdiction of SC.

The SAC has also resolved that investment and trading of Digital Assets that fulfil the above requirements, and which are traded on Digital Asset Exchange (DAX) registered with SC are permissible."[42]

Sharia Screening of Crypto-assets

If we consider the second view of scholars, then screening crypto-assets for Sharia compliance is absolutely essential. The following screenings are reasonable for crypto-assets:

1. Legitimacy screening
2. Business activity screening
3. Financials screening
4. Token screening

1. Legitimacy Screening

A study of the ICOs launched in 2017 found that more than 80% of ICOs were a scam. According to the study, the total funding of coins and tokens in 2017 amounted to $11.9 billion. $1.34 billion (11 percent) of ICO funding went to scams; the vast majority went to three large scam projects, Pincoin ($660 million), Arisebank ($600 million), and Savedroid ($50 million), which together equal $1.31 billion. This suggests that while a large number of ICOs were scams, they received very little funding when compared with the industry as a whole[43].

Sharia basis for this screening

A Sharia board should have a technical advisor who can review the project and token offering from a legitimacy and authenticity perspective. In the absence of a regulator for the crypto-asset industry, it is part of the Sharia governance to screen crypto-assets to detect scams and fraudulent activity. Any Fatwa on a token offering should reflect the findings of the legitimacy screening process. The Sharia supports such a filter and screening based on the following texts:

Almighty God says: "O you who have believed, do not consume one another's wealth unjustly but only [in lawful] business by mutual consent." [Quran 4:29]

Consuming money unjustly comprises all methods of exchanging money among the people in a way that Allah does not allow and totally prohibits. Some of these methods are fraud, bribery, and gambling. The Prophetic narration states:

"Whoever cheats us, is not one of us." [Sahih Muslim]

According to another report, the Prophet (peace be upon him) passed by a pile of food in the market. He put his hand inside it and felt dampness, although the surface was dry. He said:
"O owner of the food, what is this?'
The man said, 'It was damaged by rain, O Messenger of God.'
He said, 'Why did you not put the rain-damaged food on top so that people could see it! Whoever cheats us is not one of us." [Sahih Muslim]

Ibn Qudamah states: If a person knows that there is a defect in his goods, it is not permissible for him to sell them unless he discloses it to the purchaser. If he does not disclose it, then he is sinning. Thus, fraudulent activity is not permitted at all. The Sharia board will be discharging a form of enjoining good and forbidding evil (*amr bil-ma'ruf and nahi anil-munkar*) by highlighting potential scams. According to experts, the following are signs and indicators for a potential scam in the crypto space:

1. Plagiarism of other whitepapers and ICOs
2. Inconsistent content posting across social channels
3. Using fake followers or subscribers to create an artificial buzz
4. Unrealistic claims
5. No escrow account
6. Token distribution disproportionately favours the management team by 30% or more
7. The lack of key information in the whitepaper
8. No KYC (Know Your Customer) or AML (Anti-Money Laundering) solutions
9. Empty GitHub repositories
10. Fake wallets and private keys

In the absence of regulation from the regulatory bodies, the above checks and balances should be carried out on any token being reviewed for Sharia compliance.

2. Business Activity & Project Screening

The second screening should consider the core business activity or project of the token offering. It is not permissible to purchase the tokens of any offering whose project is primarily non-compliant with Sharia. This applies to all types of tokens being offered, equity tokens or otherwise. In security tokens, a project offers you equity and an ownership interest in the project which is symbolised by the token in return for your capital. Having an ownership interest in a non-Sharia-compliant business is not permissible. If a token offering is giving another type of token and not an equity token, it will still be discouraged to invest in the project. The primary reason behind this is that purchasing any token of a non-Sharia-compliant project will still be funding the launch of a non-compliant project.

This filter will apply for primary market and secondary market transactions. The primary market encompasses the private sales, pre-ICO sales, and ICO sales where investments are transferred directly to the token-offering company. Similarly, it will apply to secondary market transactions where investors trade the tokens among themselves. For equity tokens, it is clear that even secondary market transactions will give you an ownership interest in the project and is therefore not permitted.

Any token offering whose core business activity is from the following industries is non-Sharia-compliant:

- *Ribā*-based conventional financial services
- Exchanges and platforms for conventional non-Sharia-compliant investments
- Trading in risk and *Gharar* such as insurance companies
- Gambling, *Qimar,* and *Maysir* activities such as gambling and betting platforms
- Alcohol and prohibited beverages
- Pork-related products and non-halal food production, packaging, processing, or any direct activity linked to unlawful consumables
- Tobacco-related products
- Illicit adult industry such as pornography
- Non-Sharia-compliant entertainment

3. Token Screening

The token screening is an additional layer to the business activity screening. The business activity screening considers whether the overall project is Sharia-compliant. The token screening considers the Sharia compliance of the token use cases.

1. Transactional tokens

Any crypto-asset which is identified as a transactional token and is used solely as medium of exchange must meet the principles of currency trading and use in Sharia. As such, if it is traded in lieu of another currency, all the rules of *Bay' al-Sarf* will apply. Likewise, if it is exchanged in lieu of gold or silver, the rules of *Bay' al-Sarf* will apply as per AAOIFI Sharia Standard 1 on trading in currencies and Sharia Standard 57 on trading in gold. If the transactional token is exchanged for an asset, it will be regarded as the purchase price (*thaman*) and all the Sharia rules pertaining to the purchase price in transactions will apply.

However, as mentioned previously, this use case is perhaps the most obscure and most prone to being non-compliant from a Sharia perspective. Many or most coins neither serve as a true and genuine medium of exchange by being accepted in lieu of real goods and services and are only traded on crypto exchanges. They are not accepted as a medium of exchange at all anywhere in the world and are only traded and swapped on crypto-exchanges by many amateur investors seeking a quick profit. The illustrious Imam of the Hanafi school, Imam Muhammad al-Hasan al-Shaybani (d.189 AH) states that for something to be considered as currency, there must be widespread acceptance of it being a medium of exchange. If it does not reach a critical mass, it cannot be deemed a currency. If a token is purely designed to serve as a medium of exchange and is not serving as a medium of exchange as described by the Islamic jurists, then it will not be a valid asset from a Sharia perspective as it serves no purpose whatsoever.

2. Utility tokens

Utility tokens grant access to utility and services. Any token which gives a non-Sharia-compliant utility, service, or access to non-Sharia-compliant activities is impermissible to own and trade. It is not permissible to trade the rights to an impermissible service or utility. The Sharia rulings of *Bay'* (trading) will apply to utility tokens.

3. Asset-backed tokens

An asset-backed token is a digital representation of an underlying asset. The value of such a type of token is pegged against the value of the underlying asset. For such a token to be Sharia-compliant, the following must be ensured:

a. The token represents *Māl*, meaning it is beneficial, has utility, can be stored, and it is something humans have an interest in.
b. The token is *Mutaqawwim,* meaning it is lawful in and of itself.
c. The token represents ownership of the underlying asset and not simply a correlation in price to an underlying commodity. This is crucial - otherwise, it can be a derivative token which is not Sharia-compliant. Therefore, every time an asset-backed token is

exchanged, it must correspond to the transfer of ownership of the underlying commodity. The token is therefore a digital representation of the commodity and evidence of ownership. An asset-backed token is the tokenisation of an asset. If a non-Sharia-compliant commodity is being tokenised and sold, trading such a token will not be permitted as it involves trading non-Sharia-compliant assets.

4. Financial Ratios Screening

The financial screening criterion applies specifically for security tokens. A security token must meet the following criteria:

a. Total interest and income from any non-compliant activity must not exceed 5% of total revenue.
b. Interest-taking deposits must be less than 30% of the market capitalisation or total assets.
c. Interest-bearing debt must be less than 30% of the market capitalisation or total assets.

Chapter 6: Non-Fungible Tokens

NFT is short for Non-Fungible Tokens. An NFT is a secure, blockchain-based certificate that represents an entitlement its owner has to a (usually) digital or physical asset (e.g. artwork) or licence and permit for something. NFTs are indivisible and can store significant amounts of data, including unique information, which is what makes a particular token non-fungible, and is stored in a Smart Contract, a computer code that automatically executes upon the occurrence of a set of preconditions. As such, an NFT is essentially metadata about an asset which is added to a blockchain. This means that, while an asset is used to encode the NFT to make a unique representation of that asset, the NFT is not usually - unless there are terms to the contrary in the smart contract encoded in the NFT or in any associated terms of sale - the actual asset itself. In the case of digital assets, an NFT generally contains a link to the asset being represented, which can be stored on a blockchain or off-chain, such as on a website. The commercial value of an NFT is in its ability to prove ownership and authenticity of the asset which it represents.

Purchasing ownership of an NFT representing a work in which copyright subsists does not, unless stated otherwise, grant the new owner of the NFT ownership of the copyright in the underlying work. Copyright ownership initially vests in the work's author. What is observed and what is expected in the NFT marketplaces is that the copyright owner will grant the NFT owner a ***license*** to make certain uses of the work. It is possible to vary this position by contract. Copyright to the underlying asset (or property rights where the underlying asset is a physical asset) can be transferred if specifically agreed (and validly transferred). Smart contracts, which govern the NFT, can be coded to specify that certain proprietary rights, including copyright, are transferred on sale of the NFT. In addition, standard terms and conditions, contracts for sale, deeds of assignment or licences, expressly setting out how rights to the underlying asset are dealt with, can apply to the sale of an NFT.

Potential NFT Composition

When it comes to the underlying asset – whether physical or digital – the NFT does not always transfer copyright and propriety rights of the underlying. As such, the sale of an NFT can potentially have the following scenarios:

1. The sale of all rights of the underlying asset, including propriety rights, copyright, and rights of disposal of the underlying, as well as trading and economic rights of the NFT itself.

2. The sale of some rights connected to the underlying asset but not proprietary rights and copyright. In addition to that, the economic rights connected to the NFT itself.

The terms and conditions are pre-determined by the creator of NFT and may include benefits for buyers such as:

- Outright ownership of the asset (digital or physical transfer included)
- Exclusive access to the digital location where the asset is hosted (creative works, e.g. picture, audio, poem, tweet, GIF)
- Resale right
- Access to receive a percentage of bounty from a further resale

The Anatomy of a Digital Asset from a Sharia Perspective

Being digital does not disregard it from being an asset in Sharia, as the driving factor in being *Māl* (property) - and therefore a valid asset - is the ability to benefit from the asset in a reasonable manner. The Hanafi jurists defined *Māl* in several ways such as:

1) *Māl* is what human instinct inclines too and which is capable of being stored for the time of necessity (Ibn Abidin)
2) *Māl* is that which has been created for the goodness of human beings. *Māl* brings with it scarcity and stinginess (al-Haskafi).
3) *Māl* is that which is normally desired and can be stored up for the time of need" (Majallah).

The emphasis on being stored and retrievable all goes back to two premises:

a. The ability to transfer something from the seller to the buyer such that the buyer can use the asset without any impediment and at their free will; It is not something which is dependent on the supply of the seller, as is the case of services, nor something dependent on the grant or permission of the seller, as is the case of rights. The early Hanafis made a distinction between property, services, and rights, in that they perceived property (*Māl)* to be only that which was absolutely transferred with no further input or involvement of the seller thereafter. Services (*Manfa'ah*) require the service provision by the seller continuously for the purchaser to benefit from the service. Rights (*Huqūq*) are something permitted, granted and allowed by the grantor of rights, and nothing is transferred per se, rather the subscriber is given the benefit of use, but the overall power and ability to restrict in future is retained with the grantor.

As such, the early Hanafi jurists did not permit the sale of all rights independently, as they were not matter which can be transferred by sale, and as such, they could not be stored independently and retrieved for use at will. As time passed and society developed, the use of rights and their subsequent trading initiated. People identified these rights as transferrable goods because a trust and acceptance among people of their existence and use cases developed. Social convention (*Urf)* was established in the sale of some rights to such a degree that a person could claim and demand for such rights in the court of law and it would be upheld by the courts. *Urf* allowed the recognition of these rights as property, their reporting

and settling in case of dispute. The ability to record these rights in a systemised manner which was recognised by the people gave them the ability to be 'stored' and be 'retrievable'.

b. The idea of tangibility and being corporeal. The early Hanafi jurists alluded to the idea of *Māl* being something tangible. This idea is hinted in the manner they describe and define *Māl*. Imam al-Haskafi explicitly described *Māl* as something tangible. Of course, in earlier times, it was not conceivable for intangibles to be something storable nor retrievable, as such, intangibles were not deemed *Māl*. *Huqūq* (rights) are an example of something not retrievable nor storable. Storability simply refers to the idea 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 early Hanafi jurists put this condition for *Māl* because only storable items could be retrieved and used, and the entire purpose of *Māl* is usage and benefit.

Nevertheless, the core function of *Māl* is benefit. The great Hanafi jurist Ibn Abidin (d.1252 AH) ultimately describes *Māl* as something "made for the benefit of people which they aspire."

Digital assets are stored digitally, they are accessible, retrievable at will and also give benefit depending on what they are, they are aspired by people and therefore, have all the hallmarks of *Māl*.

The Sale of an NFT from a Sharia Perspective

If we simplify the sale of NFTs into two common scenarios, we can then present the subsequent Sharia perspectives:

1. The sale of all rights of the underlying asset, including propriety rights, copyright, and rights of disposal of the underlying, as well as trading and economic rights of the NFT itself.

From a Sharia perspective, the consideration will depend on what is actually sold. As long as what the NFT represents is Halal and lawful, then a sale of an NFT which incorporates all rights to the underlying including proprietary rights, will be a typical sale of an asset, just that it is a digital asset. It will be deemed a sale of property (*Māl*) as the buyer receives all rights connected to the digital asset.

2. The sale of some rights connected to the underlying asset but not proprietary rights and copyright.

From a Sharia perspective, this falls under the sale of rights. As long as the NFT is lawful and the rights are lawful and acceptable in Sharia, this sale can also be valid. The classical jurists permitted the sale of rights which were subordinate (*tabi'*) to an asset. They give the example

of the right of passage in a path that people would sell along with a path and land. Thus, when an NFT transfers some rights only such as the right of exclusive access and personal use rights, it is similar to the sale of the right of passage. In fact, the later jurists explicitly permitted the sale of the rights independently as it became an accepted norm and customary practice, which was then recognised legally and systemised.

Fungibles and Non-fungibles

The concept of fungibles and non-fungibles has been addressed at length by the Islamic jurists and schools of Islamic law. In summary, fungibles are called *Mithliyyat* in Fiqh, whilst non-fungibles are called *Qimiyyat*.

A fungible (*Mithliy*) is that property or asset which has an identical or near-identical asset available in the markets, such that its units are generally considered interchangeable and therefore the pricing between the units have very little discrepancy and variance if any. Examples of this include all standardised products such as cars of the same make, model and year, laptops of the same make, model and year, mobile phones of the same make, model and year etc. In essence, a fungible has another identical in form (*surah*) and substance (*Ma'na*); the appearance, the utility and the underlying value are found in several units of this genus, hence making it fungible. *Mithliy* has also been translated as homogeneous property.

A non-fungible (*Qimiy*) is that property or asset which does not have an identical or near-identical asset to it in its form (*surah*). Examples of this include animals of same genus, unique items such as a dress designed and made for one person, a painting or calligraphy which is unique. *Qimiy* has also been translated as heterogeneous property.

If a person's fungible item is destroyed by a third party, the first remedy is a like-for-like replacement, because a near-identical is present in the markets. Whereas, if a non-fungible item is destroyed by a third party, only the market value of the item is paid as damages, as an identical replacement is not possible.

Fiqh of NFTs

Whilst this is a developing field and the Fiqh will evolve as more NFTs are introduced, the following are basic Fiqh principles which highlight some of the considerations that will go into analysing NFTs.

In principle, the permissibility or impermissibility of an NFT will rest upon what the NFT is composed of; what is the non-fungible? If the non-fungible is Sharia compliant in and of itself, then assuming no other issue is found, the NFT would be considered compliant. However, if an NFT was composed of something non-compliant or there were potential

extrinsic issues which could risk Sharia non-compliance, then such an NFT may be classed as non-compliant. An NFT must represent an acceptable form in Sharia.

When reviewing NFTs, scholars will generally be considering the following principles:

a. *Maliyyah* – something which reasonable people have an inclination towards and can be retrieved when needed.
b. *Taqawwum* – something which has a lawful utility and benefit.
c. *Manfa'ah Maqsudah* – In the discussion of services, the jurists stipulate that the utility of something must be such that it is sensible and commonly sought after by people. It should not be something that the Sharia objects to or reasonable people would not seek such utility.
d. Extravagance (*Israf*) and wastefulness (*Tabdhir*).
e. Any potential wider Sharia infringements.
f. The Impact of investing in such assets, and how it impacts the remaining wealth of a person to fulfil their Islamic duties and obligations in particular to maintaining oneself and their family.

The most well-known and common NFTs have been produced in the following industries, and therefore, we will focus on these industries in terms of Sharia principles.

1. Art
2. Collectibles
3. In-game items
4. Data and Licencing
5. Media
6. Ticketing

1. ***Art***

The most common type of NFT art that's available is programmable art – a blend of technology and creativity. Art has utility. It brings colour to walls, beauty to the eye and captures the delights of the heart. Art inspires, paints a thousand words, is an expression of vision and captures what eyes generally do not see.

From a Sharia perspective, only Sharia complaint art is permissible such as calligraphy, inanimate objects, landscapes and abstract phenomena. Non-Sharia compliant art would not be permitted as an investment or production. In regard to animate art, there is a difference of opinion among scholars. Some scholars regard animate art which details every animate feature as non-compliant, and regard this to fall under the prohibition of *Taswir* (picture making). Whilst other scholars do not consider digital animate imagery and art to fall under

the prohibition of *Taswir*. Rather, they consider this prohibition more applicable to 3D animate objects and statues.

Therefore, any NFT art should not represent:

a. anything unlawful to see in Sharia
b. a vice or unlawful substance or object
c. anything sacred in Sharia which it prohibited to portray such as the Allah, the Prophets etc.
d. ridiculing or disfiguring of other people
e. limbs and areas which the Sharia orders to be covered and concealed.

What would be most useful and encouraged is the representation of reminders and art which help people in their journey to Allah and in being good people.

2. ***Collectibles***

The NFT collectibles' world represents an entire suite of underlying assets from sports memorabilia to trading cards and more.

A definitive or generalised view on all collectibles is not possible nor accurate as collectibles differ and vary. Thus, some general principles for now seem to be the best course of action. Thus, an NFT collectible should:

a. Represent something which is lawful and Halal.
b. Not be something futile and mere amusement.
c. Have a genuine utility which is of worldly benefit or spiritual benefit.
d. Not be something which the Sharia would consider a waste of money, extravagance or wastefulness.

Something may have financial value, but it may not have utility from a Sharia lens. Sharia has a paradigm and framework when it comes to understanding value and utility. The utility and perceived value of something must align with the principles of Sharia, otherwise this risks being falling under the prohibition of squandering of wealth in useless and trivial things. The perfection of a person`s faith and obedience is in his abstinence from that which is useless and brings forth no goodness.

3. ***In-game items***

NFTs for in-game items, computer-generated avatars and other game-related NFTs are something which do not reflect nor seem to align with the Sharia vision for investment in value-adding services and assets.

The Islamic jurists state that actions fall into one of the following three:

a. Reasonable purpose (*Ghard Sahih*) – anything beneficial for the worldly life or the afterlife. This is permissible and encouraged to perform.
b. Unreasonable purpose (*Ghard Fasid*) – anything negative or unconstructive for one's worldly life and has no benefit for the afterlife. This is referred to as *Lahw* in the Islamic legal texts. This should be abstained from.
c. No purpose whatsoever (*'Abath*) – anything done with no meaningful objective or reasonable outcome. This can be spurred by boredom, a lack of conscience and mental presence, or even 'killing time'. This should be abstained from also.

The above principles apply to the gaming and entertainment industry. As such, for in-game NFTs, the following principles apply:

a. Any game which has no reasonable purpose, NFTs should not be purchased for such games.
b. Anything unlawful must be abstained from.

Individuals should consult local scholars about the different types of games and entertainment.

4. ***Data and Licensing***

NFTs are becoming popular in representing non-fungible or unique data and licences such as certificates, domain names and other such specific content. As long as the underlying data is Sharia compliant, then using NFTs for this purpose is permissible.

5. ***Media***

NFTs have recently appeared in the media industry. Audios, visuals and more have been represented through NFTs. For Sharia compliance, the key principles are as follows:

a. The media should be lawful content.
b. Content should not be a deception nor misrepresent the truth.
c. The objective behind the media should be positive and beneficial.

6. ***Ticketing***

NFTs have also been tested for ticketing purposes. These tickets can grant access to special content, live performances or even sports events. For Sharia compliance, the following applies:

a. The event must not have anything unlawful or objectional in Sharia.
b. The event should be something that is of benefit to people.

Earning Royalties through NFTs

Royalties are payments to owners of property for use of that property. Royalties often deal with payments for the right to use intellectual property (IP), such as copyrights, patents, and trademarks. Royalties appear in many different industries, but they serve a similar purpose in all uses. These royalties are granted by agreement, and they allow others to use the property, giving the owner the benefit of an income from this use. Royalties also protect the buyer from claims by the owner for improper use. Some common forms of royalty payments include:

- Royalties for specific products (like a book, a piece of audio, a patented product, or a concert) are generally based on the number of units sold.
- Royalties for oil, gas, and mineral properties may be based on either revenue or on units, such as barrels of oil or tons of coal.

Intellectual Property and Intangibles in Sharia

Intellectual property and intangible rights are considered as rights (*Huquq*) in Sharia. In earlier times, such rights and intangibles were not permitted for trade. The Hanafi jurists did not permit the sale of all rights independently, as they were not something which could be transferred by sale to the counterparty, and therefore could not fall under the purview of a sale in Sharia, which required the *exchange* of two properties. And since rights could not be transferred and exclusively retained by the counterparty, the rights could not be stored independently and retrieved for use at will, this ultimately negated them from being valid property (*Mal*). As time passed and society developed, the use of rights and their subsequent trading initiated. People began to deem certain rights as transferrable goods. A social understanding and recognition among people of the existence of these rights and their utility increased. An understanding of rights as something intangible yet exchangeable and transferable was developed. This phenomenon was witnessed, recorded and upheld by social convention (*Urf*) to such an extent that a person could claim and demand for such rights in the court of law and it would be upheld by the courts. *Urf* allowed the recognition of these rights as property, their reporting and settling in case of dispute. The ability to record these rights in an orderly fashion which was recognised by the people gave them the ability to be 'stored' and be 'retrievable'. Hence, contemporary scholars like Mufti Muhammad Taqi Uthmani and others state that since many such rights are recorded and stored in legal registers, it gives these rights legal existence like that of legal persons. The existence in such registers gives it a permanent and fixed existence. The financial world acknowledges the existence and value of such intangibles. As such, it is permissible to trade and sell such

intangibles. The AAOIFI Sharia Standards also recognises the permissibility of intangible rights. The Sharia Standard No.42 on Financial Rights states:

"3/3/2 Types of rights to intangible assets: Rights to intangible assets are of many kinds, including rights to trade name, trading addresses, trademarks, commercial licenses; intellectual property, technical and industrial know-how, patents and copyrights.

3/3/3 Rules governing rights to intangible assets:

3/3/3/1 Rights to trade names, trading addresses, trademarks, copyrights, inventions and patents are the rights of their respective owners. These possess recognised monetary value in contemporary business and commercial custom. Since these rights are recognised and protected by the Sharia , it is not permissible to violate them.

3/3/3/2 Since rights to intangible assets are recognised as financial rights, it is permissible to dispose of or transfer them for consideration provided that such transactions are free of Gharar (ambiguity), deception and fraud."

Royalties in NFTs

In NFTs, royalties can be built into the code by way of smart contracts, a method of pushing a portion of the resale proceeds back to the original creator. The smart contract is a code that is executable upon the occurrence of an event that causes something else to happen, in this case, the transfer of proceeds or portion of the proceeds from the resale of the NFT on a particular marketplace. The NFT royalties are automatic pay-outs to the author made on secondary sales. These are coded into the smart contract on the blockchain. Each time a secondary sale happens on a marketplace, the smart contract ensures that the terms of the NFT are fulfilled. If a royalty is specified, a cut of the profits goes to the artist who created them[5]. NFT royalty payments are typically perpetual and are executed by smart contracts automatically, ranging from 5-10% in most instances. Blockchain technology and smart contract work together to ensure that the author is identified and the royalty payments are made immediately after the transaction is over. This removes any chance of the artist or author being cheated out of their royalties.

Sharia Compliance of Earning Royalties

In transactions of property, once a sale (*Bay'*) is executed, the seller loses all rights to the sale asset. The seller has no right to gain anything from secondary sales. Any such stipulation would be an unfair term and not Sharia compliant. The Sharia does not permit a counterparty to have an advantage and unjustly enrich themselves from the other party. The reason for not being entitled to anything from secondary sales is that a person loses all

connection with the sale item once a sale is executed. A seller has no further input or connection with the sale item, he has no rights attached, bears no risk, and therefore cannot benefit in any other way.

However, with the development of Intellectual Property and rights such as trade names, trading addresses, trademarks, licences, patents and copyrights, it is possible for the seller to have an ongoing attachment with the sale item. This attachment is recognised in legal, regulatory and accounting frameworks. These rights remain attached even when the sale item is sold and transferred to others. Since the owner of these rights has rights attached to the sale item no matter where the sale item is and who it is owned by, the seller still has a connection to the sale item. It is that connection which opens the door for the seller to gain from transactions.

Considering the above, the sale price of the item will be in lieu of the item, and the royalty charged will be in lieu of the intellectual property rights.

For the royalty to be lawful and Sharia compliant, the royalty earner must have some level of ownership rights, whether that is copyright or trademarks recorded in a licence agreement. Having no rights attached to the underlying asset and simply having a 'royalty interest' which gives right to collect a stream of future royalty payments is not Sharia compliant. That is tantamount to *Rishwa* (unlawful gains). That is because a person who has no connection with the sale item cannot benefit monetarily without bearing any interest or rights with the sale item.

Thus, for the Sharia compliance of royalties in NFTs, the person who minted the NFT must maintain copyright or other proprietary rights which will allow them to earn royalties coded into the smart contract. It is not Sharia compliant to earn a stream of royalties when the author of the underlying asset no longer owns any rights or interests in the underlying asset.

Chapter 7: Alternative Finance

Defining Alternative Finance

Alternative finance is an umbrella term that refers to a new financing mechanism that has emerged outside of the traditional financial system after the global financial crisis. It connects fundraisers directly with funders often via online platforms or websites. Alternative finance differs from traditional banking or capital market finance through technology-enabled 'disintermediation'. This means utilising third party capital by connecting fundraisers directly with funders, in turn reducing transactional costs and improving market efficiency. This type of business funding has facilitated new avenues for business financing which were not previously accessible. These financing providers are typically platforms which administer non-bank funding to small and medium-sized enterprises. Alternative finance has made raising finance easier, faster, and less time-consuming. Most of the funding through these platforms is raised through investments, loans, and donations, but the demand for this sector is based on mutual benefit. Investors have more investment choices, enabling them to donate towards a cause or generate income based on their risk appetite (any investment promising a reward, investment, or return may come with risk). Borrowers benefit from finance that is easy to apply for and quick to obtain.

Alternative finance products are a subset of fintech that offer alternative ways of accessing or providing capital, credit, or investment opportunities. Alternative finance products can include peer-to-peer lending, crowdfunding, invoice financing, equity crowdfunding, and more. Alternative finance products often target underserved segments of the market, such as small businesses, startups, social enterprises, or individuals with low credit scores or limited access to traditional financial institutions.

Alternative finance products are related to fintech in several ways. First, they leverage the power of digital platforms and networks to connect borrowers and lenders, investors and fundraisers, or buyers and sellers directly, without intermediaries. This can reduce transaction costs, increase transparency, and create more competitive and diverse markets. Second, they use data analytics and artificial intelligence to assess risk, price products, and tailor services to customers' needs and preferences. This can enable more accurate and personalized offerings, as well as faster and smoother processes. Third, they innovate and experiment with new business models, products, and regulations to address the gaps and challenges in the existing financial system. This can create new value propositions, opportunities, and solutions for both providers and users of alternative finance products.

Alternative finance products are related to fintech as they are part of the broader movement of using technology to transform the financial sector. Alternative finance products offer new ways of accessing or providing capital, credit, or investment opportunities that can benefit

both providers and users. Alternative finance products also face some challenges and risks, such as regulatory uncertainty, cyber-security threats, or market volatility. Therefore, it is important for alternative finance providers to ensure compliance, trustworthiness, and sustainability in their operations.

Many alternative finance products, such as peer-to-peer lending and crowdfunding, are delivered through fintech platforms. These platforms leverage technology to connect borrowers and lenders or investors, streamlining the lending process and reducing the costs and complexities associated with traditional financing.

In addition to providing more accessible and affordable financing options, Fintech has also enabled the development of new types of alternative finance products, such as invoice financing and merchant cash advances. These products leverage technology to provide more flexible and transparent financing options for businesses that may not qualify for traditional loans.

Moreover, Fintech has also helped to make alternative finance products more accessible to a wider range of individuals and businesses. Through online platforms and mobile applications, borrowers and investors can easily access and manage their alternative finance products, making it easier to apply for loans, manage repayments, and track their investments.

Products in Alternative Finance

Alternative finance includes several types of products. The distinction between these products is important as they differ enormously in the types of people and organisations that use them, why they use them, and the nature, form, and amount of financial transactions that take place. Some of the common forms of alternative financing include reward-based crowdfunding, equity crowdfunding, revenue-based financing, online lenders, peer-to-peer consumer and business lending, and invoice trading[44]. Below are some common forms of alternative finance:

1. Peer-to-peer lending

Peer-to-peer (P2P) lending is a form of alternative finance that involves individuals lending money to others without the use of a traditional financial institution. P2P lending platforms connect borrowers with lenders, typically using online platforms, and provide a more flexible and affordable alternative to traditional loans.

P2P lending is often used by individuals and small businesses who are unable to obtain financing from banks or credit unions. Borrowers can often receive funds more quickly and at a lower interest rate than they would through traditional lenders.

2. Small business loans

Small business loans (SBL) are another alternative finance product. SBLs service small businesses with a relatively small turnover and a few employees. SBLs are generally for those seeking low interest rates and flexibility. Less importance is placed on credit rating and trading history during the application phase.

3. Unsecured business loans

Unsecured business loans (UBL) is another alternative finance product for businesses applying for small business loans, but without restrictions on age or turnover. UBLs take credit rating into consideration and are suitable for businesses needing funds to grow without having to part from equity.

4. Asset finance

Asset finance is a facility well-suited to large investments. The terms of finance are calculated on the value of the desired asset and the duration of repayment, making this solution suitable for businesses who want to split the cost of an asset into a more manageable repayment plan[45].

5. Invoice finance

Invoice financing is a type of alternative finance that involves selling outstanding invoices to a third-party provider at a discount. This provides businesses with immediate access to cash flow, which can be used to cover expenses or invest in growth. Invoice financing is often used by small businesses that have long payment terms with their customers or clients. By selling their outstanding invoices, these businesses can receive payment sooner and avoid cash flow problems. This product allows businesses to be financed based on their receivables. Invoice financing allows funds tied up in invoices to be released and provide a business with cashflows. Capital is raised against invoices currently awaiting payment. This is generally suitable for businesses looking to free up internal capacity from chasing invoices, as lenders can take over this responsibility[46].

6. Property finance

This is a suite of products based around the concept of securing capital against commercial property (offices, retail, industrial or leisure premises, or residential properties), with the aim of developing, building, or purchasing said property. This is generally for businesses looking to invest in commercial property, perhaps to expand their portfolio or premises.

7. Stock finance

This facility provides a credit limit depending on an organisation's size and credit history. Such arrangements allow the receipt of funds at short notice, enabling businesses with a fast turnaround of high-value stock to buy new stock quickly when it becomes available, if they know in advance that it can be on sold quickly.

8. Supply chain financing

This form of financing allows businesses to borrow against their accounts payable rather than receivable, meaning this is suitable for businesses with poorer credit history, or those looking for healthier cash-flow and for a slicker supply chain. Benefits spread throughout the supply chain, too; suppliers are able to get paid more quickly and buyers are able to extend their payment terms.

Sharia-Compliant Alternative Finance Structures

The above products can be developed and structured based on Sharia structures.

1. Qard Hasan

Alternative financing can be structured based on a pure Qard basis, of course, that would not entitle the financier to any gain or profit as loans cannot be monetised.

2. Commodity Murabaha

Alternatively, depending on the commercials and the ticket size of the alternative financing, a customer enters into a Commodity Murabaha transaction not to obtain a physical asset for its use, but to engage in a series of purchase and sale transactions that result in the customer obtaining working capital. In a basic Murabaha transaction, the customer receives assets in return for a deferred payment obligation, then employs those assets in their business. In a Commodity Murabaha transaction, the customer takes the additional step of selling the assets to a third party for cash, which represents the working capital (or financing for an acquisition, as the case may be) required by the customer. Note that the customer would not necessarily be required to sell the assets to a third party; they are merely allowed to do so as the owner of the assets. The sale of the assets to a third party is not an element required to make the Commodity Murabaha transaction a valid transaction under Sharia.

Commodity Murabaha is a Sharia-compliant debt product to replace conventional business loans and provide companies with halal finance. This can be used for most of the above structures. However, we would discourage using this unless there is no alternative.

3. Murabaha

Murabaha, also referred to as cost-plus financing, is an Islamic financing structure in which the seller and buyer agree to the cost and mark-up of an asset. The mark-up takes the place of interest, which is illegal in Islamic law. As such, Murabaha is not an interest-bearing loan but is an acceptable form of credit sale under Islamic law.

Murabaha involves the financier purchasing an asset and thereafter selling the asset to the end customer on a deferred basis with a mark-up. This can be used for asset finance, property finance, and stock finance.

4. Musharaka

Musharaka is a joint enterprise or partnership structure in Islamic finance in which partners share in the profits and losses of an enterprise. Since Islamic law does not permit profiting from interest in lending, Musharaka allows for the financier of a project or company to achieve a return in the form of a portion of the actual profits according to a predetermined ratio. However, unlike a traditional creditor, the financier will also share in any losses should they occur, also on a pro rata basis.

5. Mudaraba

This is a trust-based contract where the financier provides the capital and the customer acts as the manager of the project. The profits are shared according to a pre-agreed ratio, but the losses are borne entirely by the financier, unless the borrower is negligent or dishonest. This can be used in many of the structures above, especially in the asset finance, stock finance and property finance.

6. Ijarah

This is a lease contract where the financier owns an asset and leases it to the customer for a fixed period and a fixed rent. The asset can be movable or immovable, such as equipment, vehicles or property. The asset has to be halal, usable and beneficial for the borrower. The financier is responsible for maintaining the asset, unless otherwise agreed.

Chapter 8: Crowdfunding

Definition of Crowdfunding[48]

Because of the many different crowdfunding models and the rapid development of the industry, definitions of crowdfunding are often limited; so far, no comprehensive definition of crowdfunding has been widely agreed upon in the industry. However, across most crowdfunding definitions three main elements can be identified:

1. A great number of funders are involved in the financing (the crowd);
2. An online platform facilitates and promotes the contact between the providers and the seekers of capital;
3. There is an open call to participate in the financing.

Crowdfunding is generally a tech-based platform connecting funders and companies seeking finance. The crowdfunding phenomenon covers a wide range of ways to raise money (or other resources) from the crowd for specific purposes through an open call. Instead of raising finance from traditional funding sources like banks, mutual funds, or business angels, this allows capital seekers to raise funds from a large number of capital providers through online crowdfunding platforms acting as intermediaries.

The return for investors depends on the underlying structure of the crowdfund. The return on investment can either be a tangible reward in the form of interest payments, ownership in the business, or a finished product, or an intangible reward such as recognition or pure altruism and philanthropic joy. In the latter case, the funds raised are provided as a pure donation.

Some of the regulators defined crowdfunding as follows:

- The European Commission: “Crowdfunding is an emerging alternative form of financing that connects those who can give, lend or invest money directly with those who need financing for a specific project. It usually refers to public online calls to contribute finance to specific projects.”
- The U.S. Securities and Exchange Commission: “Crowdfunding is an evolving method of raising money via the Internet to fund a variety of projects.”
- The U.K. Financial Conduct Authority: “Crowdfunding is a way in which people and businesses (including start-ups) can try to raise money from the public to support a business, project, campaign or individual.”

Crowdfunding has various interchangeable terms which are used to describe the same type of model. An example of this is P2P lending, also called crowdlending, marketplace lending,

and debt-based crowdfunding. Another example of terms that are used interchangeably to describe the same crowdfunding model are crowd-investing, investment crowdfunding, crowd-equity, and equity crowdfunding. To a large degree, the difference in terms is country-specific. For example, the European Banking Authority prefers the term lending-based crowdfunding, the UK Financial Conduct Authority prefers loan-based crowdfunding, and marketplace lending has become standard in the US.

The Growth of Crowdfunding

The global financial crisis in 2008 showed the severe weaknesses of the financial system. The epicentre of the crisis was the banks. Since then, banks have been increasingly unwilling to lend to small-to-medium enterprises (SMEs). Banks became unwilling for the following reasons:

1. Smaller loans means smaller profits

Providing low volume loans to small companies is not as profitable as providing loans to big companies for large volumes.

2. Increased regulation for banks

After the global financial crisis, regulation has increased and tightened for banks. The compliance requirements have also increased, making compliance more expensive and time consuming. Therefore, the low profits and resource-heavy requirements do not make a strong business case to service SMEs with loans.

3. Lack of collateral

SMEs tend to be higher risk as they are generally not as established and have lower turnovers than larger companies. To address this risk, secured loans tend to be preferred where collateral is furnished to service the loan if there is default. However, many SMEs do not have many assets that can cover the size of the loans.

4. Weak cashflows

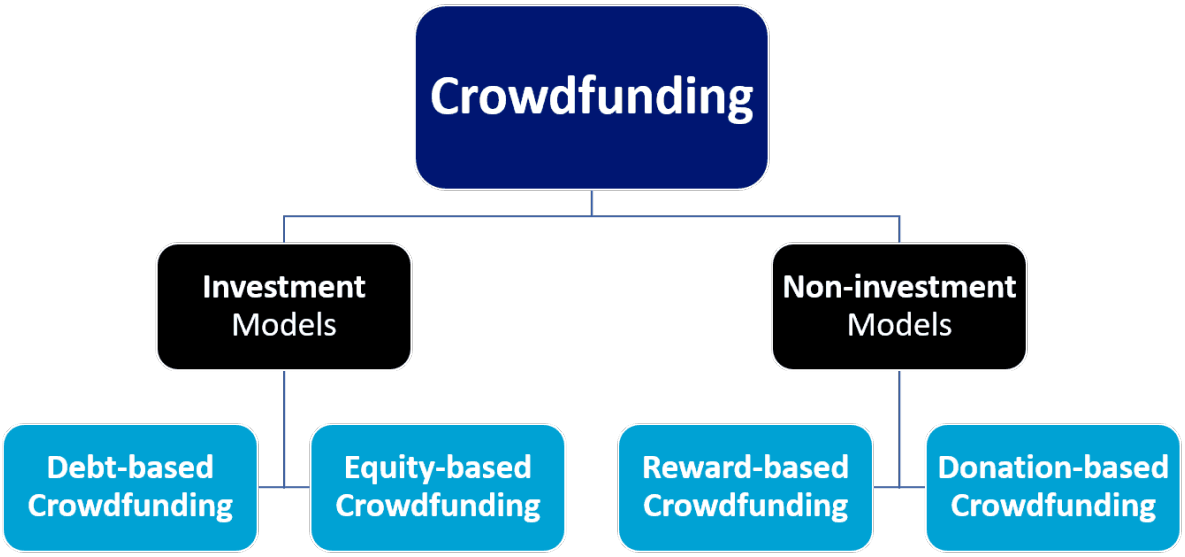
SMEs tend to have weak cashflows. Some SMEs are very seasonal businesses and therefore pose significant risk. This is a warning sign for banks that the SME may not be in a position during the year to make good on the loan.

5. Poor credit histories

Credit histories and credit scores are an indication of the creditworthiness of businesses – a high score indicates that the business is more likely to repay its debts. However, if a business lacks credit history or has a low credit score, it is very likely to be rejected for financing.

Crowdfunding Models

There are several ways in which crowdfunding models can be categorised. Crowdfunding models can be divided into investment crowdfunding and non-investment crowdfunding. This distinction highlights a fundamental difference between crowdfunding where funders act as investors aiming to achieve an economic return and crowdfunding where funders are either aiming to support a charitable project or receive a non-monetary reward. Thus, based on the rights of funders in the specific project or venture, crowdfunding can be categorised into four overall crowdfunding models illustrated in the figure below.



The differences between the models can be summarised in the following chart:

Features	Crowdfunding models (different names)			
	Donation-based Donation Crowddonation	**Reward-based Reward**	**Equity-based Equity Crowdinvesting**	**Lending-based Credit-based Crowdlending**
Motivation	Intrinsic, social	Intrinsic, social, extrinsic	Financial gain	Social or financial
Type of contribution	Donation	Pre-order	Investment	Loan
Expected return	Intangible benefits	Tangible and intangible benefits	Return on investment, profit sharing	Return on investment
Main focus	Philanthropy	Products for first adopters	Start-ups, SMEs	Short-term borrower
Complexity of the process	Very low	Low	High	Medium
Type of contract	A contracts without tangible reward	Purchase contract	Shareholding contract	Lending contract

The FCA has explained the different crowdfunding models as follows:

Alternative Crowdfunding Models According to the FCA		
Model name	**FCA Crowdfunding Category**	**Definition**
Peer-to-Peer Business Lending	Loan-based Crowdfunding	Secured and unsecured debt-based transactions between individuals/ institutions and businesses with trading history; most of which are SMEs.
Peer-to-Peer Business Lending (Real Estate)	Loan-based Crowdfunding	Property-based debt transactions between individuals/institutions to businesses; most of which are property developers.
Peer-to-Peer Consumer Lending	Loan-based Crowdfunding	Debt-based transactions between individuals/institutions to an individual; most are unsecured personal loans.
Invoice Trading	Loan-based Crowdfunding	Businesses sell their invoices or receivables to a pool of primarily high net worth individuals or institutional investors.
Equity-based Crowdfunding	Investment-based Crowdfunding	Sale of registered securities, by mostly early stage firms, to both retail, sophisticated and institutional investors.
Equity-based Crowdfunding (Real Estate)	Investment-based Crowdfunding	Direct investment into a property by individuals, usually through the sale of a registered security in a special purpose vehicle (SPV).
Debt-based securities	Investment-based Crowdfunding	Individuals purchase debt-based securities (typically a bond or debenture) at a fixed interest rate. Lenders receive full repayment plus interest paid at full maturity.
Reward-based Crowdfunding	Pre-payment or reward-based Crowdfunding	Donors have an expectation that fund recipients will provide a tangible but non-financial reward or product in exchange to their contributions. This model falls outside of FCA purview.
Donation-based Crowdfunding	Donation-based Crowdfunding	Non-investment model in which no legally binding financial obligation is incurred by fund recipients to donors; no financial or material returns are expected by the donor. This model falls outside of FCA purview.

The FCA have described the following two types of crowdfunding models as[49]:

- **Loan-based crowdfunding** – Usually called peer-to-peer (P2P) lending. People and institutions use these types of platforms to lend money directly to consumers or businesses, to make a financial return from interest payments, and the repayment of capital over time.
- **Investment-based crowdfunding** – These are platforms where investors can invest directly in businesses by buying investments such as shares or debentures.

Breaking this down further, the FCA identifies three main categories:

- **Conduit platforms** – The investor picks the investment opportunities and the platform administers the loan or investment arrangement.
- **Pricing platforms** – The platform sets the price but the investor picks the underlying loan or investment
- **Discretionary platforms** – The platform sets the price and chooses the investor's portfolio of loans to generate a target rate – this is only seen in the P2P sector.

How Does Crowdfunding Work?

Crowdfunding platforms facilitate the fundraising process for businesses and provide a user-friendly interface for investors to discover and invest in those opportunities. Crowdfunding models generally have the following three parties:

1. Providers of funding: These can be either private individuals or institutions looking to fund an exciting opportunity.
2. Seekers of funding: The seekers of funding are the project owners seeking financing for their business plan. This can be anyone - a private individual, an SME, or even a charitable foundation.
3. An online platform: This is where the project is offered to the crowd for funding. The platform usually receives a fee for this intermediation.

Typically, a crowdfunding platform has the following process:

1. Platform setup and compliance: The platform is developed to function as a secure and user-friendly website, ensuring compliance with relevant regulatory bodies (such as the SEC in the United States or the FCA in the United Kingdom). Platforms have to have their due diligence in place and have Anti-Money Laundering (AML) and Know Your Customer (KYC) protocols and implement data protection and privacy measures.

2. Business onboarding: A screening process for businesses is implemented that want to raise funds on the platform. These assess the eligibility, financials, growth potential, and legal compliance of the businesses. A platform may require businesses to provide detailed information, such as financial statements, business plans, and pitch decks.

3. Investment offering creation: Typically, but not always, the platform may assist businesses in creating their offerings by providing guidelines on crafting compelling pitch materials, determining valuation, and setting investment terms. The platform ensures adherence to any regulatory requirements and restrictions, such as maximum investment amounts or investor accreditation rules.

4. Business review and approval: The platform engages in reviewing and approving the business before they go live on the platform. This may involve verifying the accuracy of the information provided, assessing the risks associated with the investment, and ensuring compliance with regulatory requirements.

5. Offering launch and promotion: The platform launches the approved offerings and makes them visible on the platform for potential investors to discover and invest. They are typically the promoted through various channels, such as email newsletters, social media, or featured listings on the platform.

6. Investor onboarding: Simultaneously, the platform implements a seamless registration process for investors, including KYC and AML checks. At times, they provide educational resources and guidelines to help investors understand the risks and potential returns associated with the investments.

7. Investment management: The platform facilitates the investment process by providing a secure and transparent interface for investors to invest in the campaigns. They handle the processing of payments, either through the platform or with the help of a third-party payment processor.

8. Fund disbursement: If a campaign reaches its funding goal, the platform collects the investments, deducts the platform fees, and transfer the remaining funds to the financed business. In return, the business will issue equity shares or debt instruments depending on the structure to the investors as agreed upon in the term sheet.

9. Ongoing communication and reporting: The platform engages businesses to provide regular updates to their investors, such as financial reports, progress updates, or news about the company. This helps maintain investor confidence and ensures transparency in the investment process.

10. Secondary market (optional): Some platforms offer a secondary market where investors can buy and sell their investments, providing liquidity and allowing investors to exit their positions before maturity.

11. Investment maturity and exit: For equity investments, the exit event might occur through a public listing (IPO), merger or acquisition, or secondary sale of shares, or simply a buy-back of shares. For debt investments, it might involve the repayment of principal and profit according to the agreed-upon terms. The platform may facilitate these processes, either through partnerships with other financial institutions or by directly managing the transactions.

Crowdfunding Models

There are four common types of crowdfunding models in conventional finance as well as Islamic finance. They are as follows:

1. Debt-based crowdfunding
2. Equity-based crowdfunding
3. Rewards-based crowdfunding
4. Donation-based crowdfunding

1. Debt-based crowdfunding

Debt-based crowdfunding involves investors extending funds to be paid back with interest according to the repayment terms specified in a loan contract or debt security. Conventional debt-based crowdfunding includes:

a. P2P consumer lending - such as pay-day loans, wedding loans, travel loans, student loans, car loans, and refinancing. They usually involve unsecured loans that do not require the borrower to put up any collateral. However, some loans can be backed with collateral in, for example, a car or another tangible asset. The loans are usually only covered by a personal guarantee and will typically have a wide range of interest rates (depending on purpose) compared to 100% collateral backed loans. These are not Sharia compliant.

b. P2P business lending - This includes the provision of secured or unsecured loans to a business. This structure involves lending to small and medium-sized enterprises (SMEs) for purposes like working capital, equipment purchases, or expansion. Platforms like Funding Circle and OnDeck facilitate business loans by evaluating the creditworthiness of the businesses and setting interest rates accordingly. These are not Sharia compliant.

c. P2P real estate lending - This involves individuals or institutional investors providing loans secured against a property. In this structure, loans are provided for real estate projects, including residential, commercial, or development properties. Platforms like LendInvest and RealtyMogul specialize in property lending, assessing the viability and risk of the projects before setting interest rates and terms. Of course, these are not Sharia compliant.

d. Invoice financing - This involves the purchasing of invoices or receivable notes from a business at a discount. This structure allows businesses to receive advances on their outstanding invoices, improving their cash flow. Platforms like MarketInvoice and BlueVine facilitate invoice financing by advancing a percentage of the invoice amount to the business, which repays the loan when the customer settles the invoice. These are not Sharia compliant.

Debt-based crowdfunding models typically have the following advantages and disadvantages:

Advantages of Debt-Based Crowdfunding

1. Accessibility: Debt-based crowdfunding offers an alternative financing option for borrowers who may face difficulties securing loans from traditional banks or financial institutions due to strict lending criteria or credit history requirements.

2. Lower Rates: Many debt-based crowdfunding platforms offer competitive rates compared to traditional lenders, making it more affordable for borrowers to secure financing.

3. Speed and Convenience: The online nature of debt-based crowdfunding platforms enables borrowers to apply for loans and receive funding more quickly than through traditional channels.

4. Diversification for Investors: Investors can diversify their portfolios by lending small amounts to multiple borrowers, spreading the risk and potentially earning attractive returns.

5. Social Impact: Many debt-based crowdfunding platforms focus on supporting projects with positive social or environmental impacts, allowing investors to contribute to causes that align with their values.

Disadvantages of Debt-Based Crowdfunding

1. Risk of Default: Investors face the risk of borrowers defaulting on their loans, which could lead to losses. Platforms try to mitigate this risk through credit assessments, but there are no guarantees.

2. Limited Secondary Market: While some platforms offer secondary markets for trading loans, these markets may have limited liquidity, making it difficult for investors to exit their investments before maturity.

3. Regulatory Challenges: The regulatory environment surrounding debt-based crowdfunding varies between jurisdictions, with some countries imposing strict requirements or limitations on the operation of platforms. This can create challenges for both borrowers and investors who are looking to participate in cross-border lending.

4. Platform Risk: Investors and borrowers rely on the crowdfunding platform's stability and security. If a platform experiences financial or operational difficulties, it could impact the loans and returns on investment.

5. Limited Investor Protection: Unlike traditional financial institutions, debt-based crowdfunding platforms may not offer the same level of investor protection or guarantees in case of borrower default. Although some platforms have contingency funds or partner with collection agencies, there is still a level of risk involved.

6. Information Asymmetry: While platforms conduct credit assessments and provide information on borrowers, there can still be information asymmetry between borrowers and investors. Investors may not have access to all relevant information, which can make it challenging to accurately assess the risks associated with their investments.

7. Taxation right away: Returns tend to be received on a monthly basis. Generally, the return on investment is therefore taxable, as opposed to equity where tax is generally deferred until the total return of the investment is realised.

2. Equity-based crowdfunding

Equity-based crowdfunding is also known as crowd-investing and involves individuals or institutional investors providing funds in exchange for unlisted shares in a company or project. Since this gives partial ownership of the company or project, the reward for investors is a possible future cashflow stream and capital gain. Thus, investors will generally profit if the company or project performs well and lose the full investment if it fails. However, as

equity crowdfunding becomes more common, the marketability on secondary markets also increases, which means that the probability of losing the full investment decreases (if one is willing to sell at the offered price).

Equity crowdfunding opens investment opportunities that were previously only accessible to venture capital, private equity, and angel investors. The main difference between equity-based crowdfunding and the more traditional ways of raising funds with equity is that equity is offered to a wide range of potential investors through an open call on a crowdfunding platform. This type of funding is a combination of raising funds on a small stock market and raising funds from private investors. Equity-based crowdfunding is an alternative financing model that enables businesses and startups to raise capital by selling equity shares to a large pool of individual investors through online platforms. It democratises the investment process by providing an opportunity for smaller investors to participate in early-stage investments.

Equity-Based Crowdfunding Structures

1. Seed/Early-Stage Investments: This structure targets startups and early-stage businesses seeking seed capital to develop their products, services, or business models. These investments are typically high risk, but can offer significant potential returns if the business succeeds.

2. Growth/Expansion Capital: In this structure, more established businesses seek capital to fund their expansion, product development, or market penetration. While the risk is relatively lower than early-stage investments, the potential returns may also be less significant.

3. Revenue/Profit Sharing: This structure involves businesses offering investors a percentage of their future revenues or profits, instead of traditional equity shares. This model aligns investor returns with the company's performance, providing an incentive for both parties to drive business growth.

4. Convertible Notes: In this structure, investors provide loans to businesses that can be converted into equity shares at a later date, often during a future funding round or at a predetermined valuation. This allows businesses to defer valuation decisions and provides investors with the potential for future equity upside. These are typically not Sharia compliant as they are not structured as such.

5. Secondary Market Transactions: Some platforms facilitate the buying and selling of shares in private companies, enabling investors to exit their positions and providing liquidity in the equity crowdfunding market.

Advantages of Equity-Based Crowdfunding

1. Access to Capital: Equity crowdfunding allows businesses to raise capital from a large pool of investors, providing an alternative to traditional financing options such as bank loans or venture capital.

2. Marketing and Exposure: Running an equity crowdfunding campaign can help raise awareness of a business and its products or services, attracting not only investors but also potential customers and partners.

3. Investor Base Diversification: Businesses can benefit from a diverse group of investors who can provide valuable insights, industry connections, and expertise that may contribute to the company's success.

4. Validation and Feedback: Equity crowdfunding can serve as a validation of a business's concept, product, or service, as investors' willingness to invest signals market interest and confidence in the company.

5. Lower Costs: Compared to traditional financing methods, equity crowdfunding can offer lower costs for raising capital due to reduced intermediation and a more streamlined process.

Disadvantages of Equity-Based Crowdfunding

1. Dilution of Ownership: By issuing equity shares to investors, business owners may face dilution of their ownership stake and control over the company.

2. Regulatory Compliance: Businesses must comply with various regulations and disclosure requirements when conducting an equity crowdfunding campaign, which can be time-consuming and costly.

3. Limited Control over Investors: Equity crowdfunding may attract a large number of small investors, making it challenging for businesses to manage investor relations and communicate effectively with all shareholders.

4. Pressure to Perform: With a larger group of investors, businesses may face increased pressure to meet performance expectations and deliver returns on investment.

5. Lack of Investment Expertise: Some equity crowdfunding investors may lack the experience and knowledge to accurately assess the risks and potential returns associated with their investments, which could lead to unrealistic expectations or disappointment in the company's performance.

3. Rewards-based crowdfunding

In reward-based crowdfunding, crowdfunding companies give investors a non-monetary reward such as a pre-order of a unique or new product or service still under production. This enables businesses to secure cashflows and launch their product with paying customers and orders already in the books. At times, investors gain the right to a discount as a result of the investment. This allows individuals, businesses, and organisations to raise funds for their projects, products, or services by offering non-monetary rewards to backers in exchange for their contributions. Often used for creative, artistic, or innovative projects, reward-based crowdfunding platforms such as Kickstarter and Indiegogo have gained widespread attention and success.

In reward-based crowdfunding, project creators set a fundraising goal, a deadline for reaching that goal, and a list of rewards corresponding to different contribution levels. These rewards can include tangible items such as products or merchandise, or intangible experiences like acknowledgements, event tickets, or exclusive content. If the project reaches its funding goal within the specified deadline, the project creator receives the funds and is responsible for fulfilling the promised rewards. If the project fails to reach its goal, backers are typically refunded, and no rewards are distributed.

Advantages of Reward-Based Crowdfunding

1. Access to Funding: Reward-based crowdfunding provides an alternative financing option for projects, products, or services that may not qualify for traditional funding sources like bank loans or investment capital.

2. Market Validation: A successful crowdfunding campaign serves as a strong indicator of market interest and demand for a project or product, providing valuable feedback and validation for creators.

3. Increased Visibility and Marketing: Crowdfunding campaigns can generate significant visibility and publicity, attracting not only backers but also potential customers, partners, and media coverage.

4. Community Engagement: Crowdfunding campaigns create an opportunity for project creators to engage with their community of backers, who can provide feedback, support, and word-of-mouth promotion.

5. No Equity Dilution or Debt: Unlike equity-based crowdfunding or debt-based crowdfunding, reward-based crowdfunding does not require project creators to give up ownership or take on debt in exchange for funding.

Disadvantages of Reward-Based Crowdfunding

1. Limited Funding Potential: Reward-based crowdfunding may not be suitable for projects requiring substantial funding, as backers typically contribute smaller amounts compared to investors in equity or debt crowdfunding.

2. Campaign Preparation and Execution: Creating a successful crowdfunding campaign can be time-consuming and resource-intensive, requiring project creators to develop compelling pitches, produce promotional materials, and manage the campaign effectively.

3. Fulfillment Challenges: Project creators are responsible for fulfilling rewards to backers, which can involve complex logistics, shipping costs, and potential delays or complications.

4. Risk of Failure: Many crowdfunding campaigns fail to reach their funding goals, leaving project creators without the necessary funds to bring their projects to fruition. Additionally, a failed campaign can potentially damage a project creator's reputation.

5. Intellectual Property Concerns: Sharing a project, product, or service publicly on a crowdfunding platform can expose project creators to potential intellectual property theft or competition.

4. Donation-based crowdfunding

In donation-based crowdfunding, donors provide funds for philanthropic or sponsorship reasons with no expectation or right of remuneration. This is usually for altruistic and charitable intents. At times, the donors are rewarded with either a non-tangible asset such as a token, recognition, or brand promotion (reward donation), or a tangible asset of much lower value than the donation, e.g. a t-shirt or a pen. In donation-based crowdfunding, campaign creators set a fundraising goal and a deadline for reaching that goal. They then promote their campaign through social media, email, and other channels to attract potential donors. Donations can be made for any amount, and some platforms also enable recurring donations. Popular donation-based crowdfunding platforms include GoFundMe, JustGiving, and GlobalGiving, which cater to a wide range of causes, including personal emergencies, medical expenses, community projects, and non-profit initiatives. The idea behind donation-based crowdfunding was aimed at raising funds for social projects and charitable causes.

Advantages of Donation-Based Crowdfunding

1. Access to Funding: Donation-based crowdfunding offers an alternative source of funding for individuals, nonprofits, and organizations that may not qualify for traditional financing options like bank loans or grants.

2. Expanded Reach: Crowdfunding platforms enable campaign creators to reach a large and diverse audience of potential donors, increasing the chances of attracting contributions.

3. Low Barrier to Entry: Donation-based crowdfunding platforms typically have minimal requirements for launching a campaign, making it accessible for individuals and organizations with limited resources or experience.

4. Community Engagement: Crowdfunding campaigns foster a sense of community among donors and supporters, encouraging them to share the campaign with their networks and contribute to the cause.

5. No Financial Obligations: Unlike debt or equity-based crowdfunding, donation-based crowdfunding does not require campaign creators to repay loans or distribute profits to donors.

Disadvantages of Donation-Based Crowdfunding

1. Competition for Attention: The growing popularity of donation-based crowdfunding has led to increased competition among campaigns, making it more challenging for campaign creators to stand out and attract donations.

2. Reliance on Marketing and Promotion: The success of a donation-based crowdfunding campaign largely depends on effective marketing and promotion, which can be time-consuming and resource-intensive.

3. Platform Fees: Most donation-based crowdfunding platforms charge fees for their services, which can reduce the total amount of funds raised. Fees may include a percentage of the funds raised, payment processing fees, or additional charges for premium features.
4. Public Scrutiny: Launching a crowdfunding campaign exposes the campaign creator and their cause to public scrutiny, which can lead to negative feedback or criticism if the campaign is perceived as controversial or inappropriate.

5. Uncertain Funding: Unlike grants or loans, the funds raised through donation-based crowdfunding are not guaranteed, as campaigns may fail to reach their fundraising

goals. Additionally, the final amount raised may be subject to fluctuations in donor behaviour and economic conditions.

Sharia Review of the Crowdfunding Structures

1. Debt-based crowdfunding

Any debt-based crowdfunding which involves *Ribā* (interest) is not Sharia-compliant. In Islam, a loan (Qarḍ) is a gratuitous contract. Lending to people in need is a commendable practice. Both the Qur'an and Sunnah promise reward to a lender who provides a loan to a person in need. The fact that the Sharia prohibits the lender to derive any conditional benefit from the loan further emphasises its gratuitous nature. It also implies that a loan contract that is designed for profit should not be used; it is a form of social assistance to keep the community together through hard times. Thus, any profit or additional return in lieu of the loan is impermissible and non-Sharia-compliant. Interest is explicitly prohibited in the Qur'an and the Sunnah. We are told:

"Do you who believe! Fear God, and give up what remains of your demand for usury, if you are indeed believers. If you do it not, take notice of war from God and His Messenger. But if you turn back, you shall have your capital sums: Deal not unjustly, and you shall not be dealt with unjustly" (al-Qur'an, 2:278-279).

A famous juristic maxim states: "Any loan which draws an increment is *Ribā*" (Ibn Abi Shaybah).

Ribā is more than just simple interest and compound interest; *Ribā* is any unjustified excess in a bilateral contract which is stipulated for one of the two transacting parties and is without consideration. Scholars outline two types of *Ribā*:

1) *Ribā al-Nasi'ah* is the advantage and excess gained without consideration by deferring delivery of any homogenous counter exchange. This excess manifests upon default or delay in payment where time is factored as a consideration.
2) *Ribā al-Fadhl* is a contractually agreed excess in units without any consideration in an exchange of homogeneous goods.

Sharia has not considered money to be a commodity, but a medium of exchange. When money of the same genus is exchanged, it must be on spot and in equal quantity. Exchanging different amounts at different times brings into effect both forms of *Ribā*: *Ribā al-Nasi`ah* and *Ribā al-Fadhl*.

Jabir stated that God's Messenger (peace be upon him) cursed the receiver of interest and its payer, as well as the one who records it and the two witnesses; he said, "They are all equal." [Abu Dawud]

2. Equity-based crowdfunding

This model is similar to raising capital through the issuance of shares. Therefore, to be Sharia-compliant, any such crowdfund must satisfy the Sharia screening criteria. The Sharia screening criteria involves a review of the core business activity of the crowdfunding company to see if it is a Halal business. If the company successfully passes this screening, the financials of the company must be screened to ensure the impure income is less than 5% of total revenue; interest-based payables are below 30% of total assets and its interest-based receivables are also below 30% of total assets.

3. Real estate crowdfunding

Real estate crowdfunding is similar to equity crowdfunding. If it is a residential property, there is a very low Sharia non-compliance risk. If it is commercial property, there is a greater risk of non-compliance, as it is an AAOIFI Sharia Standards' requirement that the commercial tenant's business be Sharia-compliant.

4. Donation-based crowdfunding

This model consists of pure donations to the campaigner. For social projects, charitable projects, and not-for-profit ventures, this structure is permissible and is rewarding for donors. When it comes to for-profit ventures - raising capital for business or for personal gain - then there is a Sharia non-compliance risk based on the prohibition of begging and asking others for wealth for personal gain when there is no real necessity. The following prophetic narrations highlight this risk:

"It is better for one among you to bring a load of firewood on his back and give charity out of it (and satisfy his own need) and be independent of people, than that he should beg from people, whether they give him anything or refuse him. Verily the upper hand is better than the lower hand, and begin (charity) with your dependents." [Muslim]

"He who begs the riches of others to increase his own is asking only for live coals, so let him ask a little or much." [Muslim]

The Messenger of God (peace be upon him) has prescribed the act of requesting others for help under three particular circumstances, which are described in a narration in Sahih Muslim:

1. One who has undertaken a financial liability to reconcile between people.

2. A man whose property has been destroyed by a calamity.

3. A person who is suffering from genuine poverty.

In all three scenarios, the narration states that it is only permissible to ask until the need is fulfilled. Considering this, the donation-based crowdfunding model is not recommended for a person who is not poor or someone who does not fall into the above categories.

Measuring the Sharia Compliance of a Crowdfund

The Sharia compliance of any crowdfunding depends on the following elements:

1. The business of the company
2. The financials of the company
3. The purpose of the crowdfund
4. The structure of the crowdfund

1. The business of the company

Before a company can be admitted on a Sharia-compliant crowdfund, its core business activity should be reviewed to ensure it does not violate any Sharia principle. Raising funds and investing in a non-compliant business is a means of growing that non-compliant activity, which is directly at odds with the Islamic principles. The business or start-up seeking investment or financing should not be from the following:

a. Companies in the financial services industry that are involved in interest-based lending and/or distribution of interest-based products. This includes financial intermediaries such as conventional banks, conventional insurance, and interest-based lending (excluding windows operating in compliance with Sharia principles);
b. Manufacturing or distribution of alcohol and tobacco;
c. Companies operating in betting and gambling operations like casinos or manufactures and providers of slot/gambling machines;
d. The production, packaging, and processing of, or any other activity related to pork and non-halal food and beverages;
e. Bio-technological companies involved in human genetic manipulation, alteration, mutation, and cloning, excluding those that are involved in medical research; and
f. Non-Sharia-compliant entertainment and illicit adult industries.

2. Financials of the company

A crowdfunding company must meet the following criteria:

a. Total conventional debt (interest bearing) divided by the total assets of the company must be less than 30%;
b. Interest-bearing securities divided by the total assets must be less than 30%; and
c. Non-permissible income must be less than 5% of total revenues.

3. The purpose of the crowdfund

The objective of raising funds must be Sharia-compliant. If a company or start-up is raising funds to develop something non-compliant or to expand its business to incorporate a non-compliant service, it should not be admitted onto a Sharia-compliant crowdfunding platform.

4. The structure of the crowdfund

The fourth level of review is the actual mechanics and structure of the crowdfund. If it is debt-based, it must be a valid Sharia-compliant model such as Qarḍ Hasan (interest-free loan), Murabaha (cost-plus financing), or Commodity Murabaha. If it is equity-based, it must fulfil the principles of either Musharaka or Mudaraba. At this particular level, the contracts, rewards, profit structure, liability, claims, and the profit/loss sharing dynamics will all be reviewed to ensure Sharia compliance.

Islamic Crowdfunding Structures

There are two famous structures in Islamic Finance which are used to establish equity-based crowdfunding: Mudaraba and Musharaka.

Mudaraba

Mudaraba refers to a relationship between an investor (*Rab al Māl*) and an investment manager (*Mudarib*) to establish a profit-sharing partnership to undertake a business or investment activity. Under this structure, the *Rab al Māl* provides the financing and the *Mudarib* provides the professional, managerial, and technical know-how to carry out the business or manage the investment. The *Mudarib* must invest the funds in a Sharia-compliant way. The parties share in any profits according to a pre-agreed ratio. In a *Mudaraba*, the *Mudarib*:

- Puts only their time and effort at risk and does not contribute any capital.
- Is not responsible for any losses of the venture unless there is misconduct, breach of terms, or negligence. Losses are borne by the *Rab al Māl.*

Musharaka

A *Musharaka* is an investment partnership or joint venture compliant with Islamic principles. In a Musharaka, the financing party and its client contribute assets (cash or property) to a joint venture and share in the profits of the joint venture in agreed percentages. Losses, however, are shared in accordance with the parties' initial investment. All Musharaka parties have the right to exercise control over the joint venture, but it is typically managed by the client.

Musharaka is similar to Mudaraba except that only the financing party bears the losses associated with the joint venture or partnership in a Mudaraba.

Murabaha

Sharia-compliant debt-based crowdfunding is generally through Murabaha and Commodity Murabaha.

Murabaha is a financing method common with trade finance and asset-acquisition finance. Under a Murabaha, the financier buys an asset from a supplier and sells it to the customer on deferred payment terms with a fixed maturity date. This is one of the most common debt-financing products in Islamic Finance.

Commodity Murabaha

A variation on the Murabaha financing is the Reverse Murabaha or Tawarruq or Commodity Murabaha. In a Reverse Murabaha, rather than retaining the asset for use in its business, the customer sells it at *spot* price to a third party. The asset used is typically a freely tradable commodity such as platinum or copper. In this way, the customer can obtain a cash sum in return for periodic instalments through buying and selling assets.

Case Study: EthisCrowd

EthisCrowd is arguably one of the world's first real estate Islamic-crowdfunding platform. This platform facilitates investment in entrepreneurial, business, trade, and real estate activities in 'Emerging Asia'. Ethis has a network across Singapore, Indonesia, Malaysia, and Australia. The expertise of EthisCrowd is manifested in how it crowdfunds the construction of affordable and commercial housing, mostly in Indonesia, through private and institutional investors as well as Islamic banks[50].

According to the Islamic Fintech Report 2018, the company boasts 24,373 community members with $5.59 million in crowd-investments made and $1.64 million of pay-outs to crowd-investors. As per the date of the report, the total value of projects by EthisCrowd in

2018 is $52.8 million. The process of Ethis is straightforward. Investors sign up, browse, and select the campaigns they want to invest in. They can then invest directly into the bank accounts of the project. Thereafter, investors will receive monthly project updates by email and on their dashboards on Ethis.

Ethis uses two different Islamic contracts and structures for its investments. The first is an Istisna' (manufacturing) contract. The Istisna' contract is structured in the following way:

1. The project developer appoints Ethis Pte Ltd (Singapore) as the crowdfunding agent.

2. The investors appoint Ethis as the agent (wakeel) through a Wakalah agreement to execute an Istisna' agreement with the developer for a quantified amount of housing units.

3. The investors sign an Istisna' facility letter and appoint PT Ethis as the agent to act on behalf of the investors.

4. PT Ethis enters into an Istisna' contract with the project developer to fund the construction of the specified number of housing units. The agreement is governed by Indonesian law allowing PT Ethis to take legal action in cases of any misconduct by the project developer.

5. The investments are transferred into PT Ethis' Singapore-dollar denominated bank account in Indonesia.

6. Payments are made to the project developer based on the milestones of the construction.

7. The project developer develops the agreed housing units.

8. Upon the initiation of the construction, the project developer transfers the conditional ownership of the housing units to PT Ethis through sale certificates (PPJB). Upon the completion of construction, PT Ethis disburses the remaining sale price to the developer and the Istisna' contract is concluded.

Upon the completion of the Istisna' agreement, the next contract is a Murabaha contract which facilitates the sale of the housing unit to the end-user. The Murabaha is structured in the following manner:

1. PT Ethis selects the project developer as an agent. The project developer's role is to find potential buyers of the units.

2. The project developer sells the units to end buyers approved by Bank Indonesia and the financing bank, commonly Bank BTN Syariah.

3. PT Ethis transfers the sale certificate (PPJB) of the units to the end house buyers.

4. Through a standing instruction on the bank account of the project developer, the proceeds from the sale of the housing units are shared between PT Ethis and the project developer.

5. The financing bank makes both transfers, e.g. 70% to PT Ethis and 30% to the Project Developer (as the Wakalah fee from PT Ethis).

6. PT Ethis transfers the investment amounts and the profits to the investors. (EthisCrowd, 2017)

EthisCrowd is an exceptional display of Islamic Fintech. The power of innovative technology is harnessed to connect global investors to invest in the growth of the real economy and provide real estate to those in need.

Chapter 9: Investment-based Technology

InvestTech is a type of Fintech start-up that uses advanced technology and data analytics to provide innovative investment solutions, seamless investing platforms, or alternative data insights across retail and institutional client segments[51].

They can be considered a subset of Fintech which are disrupting traditional investment platforms. Robo-advisers that use digital platforms to provide financial advice based on mathematical rules or algorithms with minimal or zero human involvement tend to be the most well-known InvestTech. InvestTechs are also looking to use their ability to tap new data sources to help both institutional investors and the investment management firms that traditionally serve them.

The next generation of investment technology leverages the following to change the investment landscape:

1. Artificial Intelligence (AI)
2. Big Data
3. Data latency – the speed in acquiring or processing error-free inputs
4. Inferential depth – the profoundness and durable accuracy of insights

InvestTech combines technology, data science, and financial services to revolutionise the way individuals and institutions manage their investments. As the financial landscape undergoes rapid transformation, InvestTech platforms are becoming increasingly important for optimizing investment strategies, improving returns, and reducing costs.

InvestTech has emerged as a response to the growing demand for more efficient, data-driven investment strategies. Traditional investment management approaches have long been criticized for their high fees, lack of transparency, and limited customization. As technology advances, InvestTech is bridging the gap between investors and their financial goals by providing innovative solutions that cater to different investment styles, risk tolerances, and objectives. The InvestTech industry has experienced tremendous growth in recent years, with a plethora of platforms and tools available to investors.

Different InvestTech Platforms

There are different InvestTech platforms, as follows:

1. Robo-advisors: Robo-advisors are automated investment platforms that use algorithms to create and manage portfolios based on an investor's risk tolerance, time

horizon, and financial goals. Notable examples include Betterment, Wealthfront, and Vanguard's Personal Advisor Services.

2. Social trading platforms: These platforms allow investors to follow and copy the trades of other successful investors, gaining insights from their strategies. eToro and ZuluTrade are popular social trading platforms.

3. Trading and analysis platforms: These tools provide advanced charting, analytics, and trade execution capabilities for investors. Platforms like TradingView, MetaTrader, and Thinkorswim are popular among traders and investors.

4. Portfolio management tools: These platforms help investors manage, track, and analyse their investment portfolios. Examples include Personal Capital, SigFig, and Morningstar.

5. Artificial Intelligence (AI) and Machine Learning (ML) based platforms: These cutting-edge platforms leverage AI and ML algorithms to analyse vast amounts of data and generate investment insights, predictions, and strategies. Notable players in this space include Alpaca, Kensho, and Sentient Investment Management.

Enabling Elements of InvestTech

InvestTech is dependent on certain tech enablers, such as:

1. Algorithmic trading: InvestTech has enabled the development of advanced trading algorithms that can execute trades at high speed and low cost, offering opportunities for both retail and institutional investors.

2. Risk management: InvestTech platforms provide sophisticated tools for monitoring and managing investment risks, helping investors make better-informed decisions.

3. Portfolio optimization: InvestTech enables investors to create highly customized, diversified portfolios that are optimized for their specific risk tolerance and investment objectives.

4. Data analytics: InvestTech platforms harness the power of big data and advanced analytics to generate insights and identify trends that can inform investment strategies.

5. Financial planning: InvestTech has given rise to a new generation of financial planning tools, enabling investors to create comprehensive financial plans and track their progress towards achieving their financial goals.

Potential Benefits

InvestTech has benefits, including:

1. Cost efficiency: InvestTech platforms often have lower fees than traditional investment management services, making investing more accessible to a broader range of investors.
2. Customization: InvestTech allows investors to create highly personalized investment strategies that cater to their unique needs, goals, and risk tolerance.
3. Access to global markets: InvestTech platforms provide investors with access to a wide range of global investment opportunities, expanding their options for diversification.
4. Enhanced decision-making: InvestTech platforms provide investors with real-time data, advanced analytics, and research tools that can help them make more informed investment decisions.
5. Automation: InvestTech platforms automate various aspects of the investment process, from portfolio management to trade execution, reducing the potential for human error and emotional bias.

Potential Risks

Some of the risks that have been highlighted in InvestTech include:

1. Limited human interaction: The reliance on technology in InvestTech platforms may leave some investors feeling disconnected from their investments and seeking more personalized advice or guidance.

2. Overconfidence in technology: As with any technology, InvestTech platforms and tools are not infallible. Over-reliance on algorithms and AI can lead to misplaced confidence, potentially causing investors to overlook crucial market factors or human judgment.

3. Data privacy and security concerns: With the increasing amount of personal and financial data being shared and analysed, the risk of data breaches and cyber-attacks also increases, potentially exposing sensitive information.

4. Potential job displacement: As InvestTech continues to disrupt the traditional investment management industry, there is a risk of job displacement for financial professionals who do not adapt to the changing landscape.

5. Regulatory challenges: The rapid evolution of InvestTech has outpaced the development of regulatory frameworks in many jurisdictions. This can result in a lack of clarity and potential legal risks for both investors and InvestTech companies.

Robo-advisory

Robo-advisory is a popular area in the Sharia compliant InvestTech space. Investors today can build and manage their portfolio in one of three main ways:

- Hire a financial advisor to create an expertly curated portfolio.
- Use a do-it-yourself approach to pick investments.
- Enlist a robo-advisor to put together a portfolio.

Robo-advisors — also known as automated investing services or online advisors — use computer algorithms and advanced software to build and manage an investment portfolio. Services range from automatic rebalancing to tax optimisation, requiring little to no human interaction. However, many providers have human advisors available for questions. These software products help manage investments without the need to consult a financial advisor or self-manage a portfolio[52]. Registering with a robo-advisory platform takes the following typical steps:

- Online questionnaire: The questionnaire will ask fact-finding questions such as investment habits, investment goals, risk appetite, available savings, etc. At times, if the questions have not been answered satisfactorily or the algorithms determine that a person is not in a position to proceed and invest, the investor can be turned away and declined.
- Risk profile selection: If a questionnaire is completed successfully, a potential investor would then be introduced to a spectrum of risk profiles ranging from 'very conservative' to 'very aggressive'. Robo advisors then crunch the data to offer an asset allocation approach and build a portfolio of diversified investments.
- Investment: Once funds are invested, the software can automatically rebalance the portfolio on an ongoing basis —that is, make changes to the investments needed to align the portfolio back to the target allocation.

Robo-advisors Features

Robo-advisory platforms generally have the following features:

- Fees are very competitive and, many a time, under 1%.
- The sites are usually user-friendly and easy enough to navigate on mobile.
- A good spectrum of investment portfolios is offered.

- Regular rebalancing of that portfolio, either automatically or at set intervals — for example, quarterly. Most advisors do this via a computer algorithm so a portfolio never gets out of sync from the original allocation.
- Financial planning tools, such as retirement calculators.
- Tax strategies and basic tax information.

Benefits of Robo-advisors

Some of the potential benefits of robo-advisory services are as follows:

- **Reduced mistakes –** Amateur investors are likely to make more mistakes whilst investing. Robo-advisory services may reduce the element of simple mistakes.
- **Automation –** Robo-advisory facilitates the automation of investment. The investor does not have to worry over or make decisions on their portfolio or which sector to invest in.
- **Smaller investments –** Robo-advisory platforms have a very low entry level investment requirement. Traditional advisory firms generally require a higher amount to initially invest and impose fees that are often higher than those charged by robo-advisors.

Sharia Considerations of Robo Advisory

Robo advisory is neutral from a Sharia perspective, meaning that it can be used for permissible or impermissible advisory services. Hence, from a Sharia compliance perspective, the following will be crucial:

1. Client assessment

During the client assessment and the ascertaining of their investment objectives, no non-Sharia-compliant objectives should arise. If the client raises non-Sharia-compliant objectives for investment, a Sharia-based platform should not facilitate such an investment objective.

2. Types of investments offered by the robo-advisory

All investments offered by the robo-advisory platform must be Sharia-compliant. No investment which contradicts Sharia principles can be offered. Hence, the robo-advisor cannot offer portfolios with the following assets:

a. Bonds
b. Non-compliant ETFs
c. Non-compliant ETCs

d. Derivatives
e. Non-compliant equities
f. Money market securities

3. Fees

All fee structures should be Sharia-compliant and for actual services.

4. Services

The services offered by the platform should all be Sharia-compliant.

Investments from a Sharia Perspective

The previous chapter highlighted the Sharia screening criteria for crowdfunding projects. All investments should undergo the scrutiny of the same Sharia screening criteria. Certain investments such as private equity investments require additional layers to ensure everything is Sharia-compliant. Hence, for any investment via InvestTech, the following must be reviewed:

1. Business activity screening
2. Financials screening

1. Business Activity & Project Screening

This screening should consider the core business activity of the business company. For a company to be Sharia-compliant and for the investment to be sound, any equity purchased must not be in the following industries:

- *Ribā*-based conventional financial services;
- Exchanges and platforms for conventional non-Sharia-compliant investments;
- Trading in risk and *Gharar,* such as insurance companies;
- Gambling, *Qimar,* and *Maysir* activities, such as gambling and betting platforms;
- Alcohol and prohibited beverages;
- Pork-related products and non-halal food production, packaging, processing, or any direct activity linked to unlawful consumables;
- Tobacco related products;
- Illicit adult industry, such as pornography; and
- Non-Sharia-compliant entertainment and recreational facilities.

The above business activities have been prohibited due to the following reasons:

1. *Ribā-based conventional financial services (conventional banking and conventional investments)*

Ribā is categorically prohibited in the Qur'an. The Qur'an says:

"O you who believe! Remain conscious of Allah, and give up all outstanding gains from usury, if you are [truly] believers; for if you do it not, then know that you are at war with Allah and His Messenger. But if you repent, then you shall be entitled to [the return of] your principal. You will do no wrong, and neither will you be wronged. [Surat Al-Baqarah, 278-279]

Prophet Muhammad (peace be upon him) said:

"Cursed is the one who takes interest, and the one who pays it, the one who records it, and the two who (accept to be the) witnesses for signing it." [Muslim]

2. *Trading in Gharar (uncertain/contingent) laden subject matters (uncertainty)*

The Prophet Muhammad (peace be upon him) prohibited *bay' al-gharar* (uncertainty) [Sahih Muslim]. The scholars of Islam state that this narration refers to trades harnessing major uncertainty, as well as the actual trading and transfer of risk[53]. Risk is not a tradable commodity. Thus, the Prophet Muhammad (peace be upon him) clearly prohibited trading and exchanging risk. In prohibiting *Gharar*, the Sharia has also prohibited the trading of risks and, thereby, prohibiting derivative instruments designed to transfer risk from one party to another.

3. *Gambling, Qimar, and Maysir activities*

The Qur'an states:

"They ask thee concerning wine and gambling. Say in them there is great sin and some benefit for men. The sin is greater than the benefit." [Qur'an 2:219]

"O believers! Intoxicants and gambling, worshipping stones and divination by arrows are impure, of Saytan's handiwork: refrain from such abomination so that you may prosper." [Qur'an 5:90]

Abu Hurayrah narrates that the Prophet Muhammad (peace be upon him) forbade transactions determined by *Hasāt* and *Gharar*. [Muslim] *Hasāt* is a transaction contracted on chance. *Hasāt* linguistically means pebble or small stone. An example of a *Hasāt* transaction is

when a person says to a customer, "I will sell give you that item which your pebbles fall on". It is clear that the transaction is based on an unknown outcome and therefore has uncertainty in the subject matter of the contract. Thus, it is non-Sharia-compliant.

4. *Alcohol and prohibited beverages*

The Qur'an states:

"Satan wants only to excite enmity and hatred between you with intoxicants (alcoholic drinks) and gambling, and hinder you from the remembrance of God and from The Prayer. So, will you not then abstain?" [Qur'an 5:90-91]

Abdullah Ibn Umar narrates that Prophet Muhammad (peace be upon him) said: "Every intoxicant is *Khamr* and every intoxicant is unlawful (*Haram*)…" [Sahih Muslim]

5. *Pork-related products and non-halal food production, packaging, processing, or any direct activity linked to unlawful consumables.*

Pork is expressly forbidden in the Qur'an:

"He has forbidden you Maytah (dead animals), and blood, and the flesh of swine…" [Qur'an 2:173]

6. *Tobacco-related products*

It is a factual reality that smoking harms one's health. We have been instructed by God to not destroy ourselves with our own hands and actions:

"And make not your own hands contribute to (your) destruction." [Qur'an 2:195]

Some scholars have argued that tobacco qualifies as *al-Khabā'ith* (filthy substances) which was prohibited in the following verses:

"He permits *At-Tayyibāt* (i.e. all good and lawful as regards things, deeds, beliefs, persons and foods), and prohibits *al-Khabā'ith* (i.e. all evil and unlawful as regards things, deeds, beliefs, persons and foods) [Qur'an 7:157]

7. *Illicit adult industry (pornography)*

Pornography and illicit relationships have been deemed shameful and indecent in Islamic teachings. The following verses in the Qur'an explicitly prohibit such activities:

“Surely God enjoins justice, kindness and the doing of good, to kith and kin; and He forbids all that is shameful, indecent, evil, rebellious and oppressive." [Quran 16:90]

"And do not come near to adultery, for it is a shameful deed and an evil, opening the road (to other evils)." [Qur’an 17:32]

"Verily those who love that indecency should spread among the believers deserve a painful chastisement in the world and in the Hereafter. Allah knows, but you do not know." [Quran 24:19]

2. Financial Ratios Screening

Any company which passes the business screening activity must also satisfy the following financial ratios screening criteria.

1. Total interest and income from any non-compliant activity must not exceed 5% of total revenue.
2. Interest-taking deposits must be less than 30% of the market capitalisation if it’s a listed company, otherwise, book value or total assets.
3. Interest-bearing debt must be less than 30% of the market capitalisation if it’s a listed company, otherwise, book value or total assets.

These financial ratios are based on scholarly reasoning. In the late 1980s and early 90s, the scholars reviewed the issue of investing in listed equities. The majority of the listed companies had interest-bearing debt and interest receivables. Thus, the scholars saw that there was *Umūmul balwā* (widespread exposure and difficulty) which cannot be resisted unless one adopts a nomadic approach to business and finance. Therefore, the scholars at the time were of the view that there should be some allowance and concession to invest in equities which are exposed to minimal impure income on the condition that the Muslim investor does not benefit from or keep such impure income. Most listed equities in the west keep deposits in interest-bearing business accounts and cannot find alternatives. Likewise, many of the listed companies are founded and directed by non-Muslims, which use interest-based lending for financing. Hence, scholars analysed the primary and secondary sources to identify a benchmark to differentiate between excessive impure income exposure and non-excessive. However, the challenge they faced was determining an acceptable threshold. Some proposed 49%, as that is the final number to remain a ‘minority’. However, others argued that Prophetic narrations have considered one-third as being sufficient and excessive, for example the following narration:

Sa’d said: “I was stricken by an ailment that led me to the verge of death. The Prophet came to pay me a visit. I said, ‘O God’s Apostle! I have much property and no heir except my single daughter. Shall I give two-thirds of my property in charity?’ He said, *‘No.’* I said, ‘Half of it?’

He said, *'No.'* I said, 'One-third of it?' He said, *'You may do so, though one-third is also excessive."* [Bukhari]

Similarly, Imam Malik and the Maliki school have considered one-third as excessive in other areas of Islamic law too. Based on the above, scholars felt that there is a reference to excessiveness in the sacred text and in Islamic law which was quantified as one-third. Thus, scholars settled on one-third as a benchmark for excessiveness. Although 30% is not one-third, 30% was seen as a reasonable standard just below one-third to prevent the "excessiveness" from being within touching distance. Although this is contemporary scholarly reasoning, since then, the majority of scholars have adopted this view. This view has gained further strength and is now an industry-based standard with widespread scholarly acceptance and approval.

Chapter 10: Neo-banking

Defining Neo-banks

The word 'neo-banking' is increasingly catching headlines. Neo is a Greek word which means "new". Neo-banking is therefore "new-banking". This is an umbrella term to distinguish a range of digital platforms from the traditional banking sector. In recent years, the banking landscape has been transformed by the emergence of neo-banks and challenger banks, which leverage technology and innovative business models to offer a range of financial products and services. These new players have gained significant traction, attracting customers with their user-friendly interfaces, competitive pricing, and digital-first approach. Neo-banks are characterised as cutting-edge, seamless, and user-friendly digital-only banking services. Neo-banks come in all shapes and sizes with varying levels of licensing and limitations, but the common thread between all is that they are generally online platforms with no physical branch. They are usually in the forms of mobile applications. Although we are using the term neo-banks as an umbrella term for digital platforms offering banking-like services, not all such digital platforms are banks in the technical sense. In order to be defined as a "bank" in the UK, the company must be authorised to accept retail deposits by the UK financial regulator the Prudential Regulation Authority (PRA). Hence, many neo-banks are not technically "banks".

Neo-banks come in all shapes and sizes with different licences. The type and volume of products and services offered by a neo-bank depends on the type of licence they hold. Neo-banks typically go through the following lifecycle:

1. Payment services firm – unable to hold the customer balance's overnight.

2. E-money firm – can hold e-wallet balances for the customer, but backed by a separate client money trust account.

3. Bank – where there is a direct relationship between the account holder and the custodian; where the account holder is really a creditor of the bank and the deposits are on the bank's balance sheets to leverage within the regulatory framework.

Neo-banks can be simplified into two regulatory structures:

1. No banking licence

Financial companies who have no banking licence offer a service and gateway to banking services through other regulated institutions with funds generally held in a traditional bank. Funds are held in a tier 1 bank with a ring-fenced structure, meaning customer funds cannot

be invested or used by either the Neo-bank or the tier 1 bank. In the UK, this is done by these financial companies registering as EMD agents (Electronic Money Directive) of companies which have an e-money licence. The principal is registered with the FCA as Electronic Money Institutions. A PSD (Payment Service Directive) or EMD agent is a firm that can act on behalf of another firm which is authorised or registered by the FCA as a payment or e-money institution. Services that are rendered by E-money agents can include merchant solutions, e-wallets, e-vouchers, and payment processing.

E-money institution (EMI) can issue electronic money (the digital equivalent of cash stored on an electronic device) and can offer the services of execution of payment transactions (including credit transfers and direct debits), issuing or acquiring payment instruments, money remittances, foreign exchange services, and similar services. EMI can do all the things the Payment Institution can do; it is also allowed to provide IBAN accounts, payment cards, and e-wallets[54].

2. Own banking licence

Acquiring a banking licence is challenging, with several hurdles and regulatory requirements. Having a banking licence allows any digital bank to offer FSCS-protected deposits and lending services for customers.

Features of Neo-banks

a. Overall experience

Mobile applications of neo-banks host a whole range of features, making them user-friendly and pleasant for millennials in comparison to many traditional banking apps. This way, neo-banks can both challenge and renew the financial services that many of the major banks currently have. There are often a number of features that allow a customer to customise their dashboards and services according to their needs.

b. Hassle-free account creation

Opening a new account in a bank requires a lot of personal information and potentially a visit to the bank with documentation. It's an old, tedious process. Neo-banks have completely eliminated this. An account can be opened in 10 minutes from one's home directly via the mobile-banking application.

c. User-friendly interface

Neo-banks are all about providing an excellent customer experience. This also means customers do not have to work through a glitchy web-based banking platform. Furthermore,

mobile apps tend to be very responsive. They are crisp, clean, and user-friendly. They're well-designed to suit the needs of customers and the younger generation. The ease of use is what makes the app such a hit amongst its customers.

Neo-banks don't offer novel banking services; their services are similar to those of traditional banks, but with a hyper-enhanced and personalised customer experience. Neo-banks generally have leaner business models and superior technologies at their disposal compared to traditional banks, providing ease and efficacy in services such as seamless account creation, round-the-clock customer service supported by chatbots, near real-time cross-border payments, and artificial intelligence (AI) and machine learning (ML)-enabled automated accounting, budgeting, and treasury services. A chat feature is often offered where you can access help directly in the app.

d. Smart reporting

Many neo-banking apps have smart budget tools, allowing a customer to see spending habits across multiple bank accounts which are all integrated within the app. Furthermore, neo-banking apps tend to have a greater breakdown of spend and expenses, as well as push notifications to one's phones, with the inflow and outflow of funds. Apps tend to have the ability to input saving goals and forecasting tools, allowing greater command and insight into one's financial behaviour.

e. Services

Although many of the financial services are similar to traditional banks, the user experience is exciting. Typical neo-bank services include current accounts, mobile apps, payment cards, live exchange rates, money transfers, loans, savings accounts, and analytics to improve spending behaviours, among many other financial services similar to – or an extension of – traditional banking services. Furthermore, most neo-banks offer physical and virtual cards. The virtual card is an onscreen card which can be used to make contactless payments.

Neo-bank Differences

Digital banks vs neo-banks

Although the terms digital banks and neo-banks are used interchangeably, they are not entirely the same despite both operating via mobile phone applications and seemingly appearing to be similar. As we discussed above, a neo-bank is not always technically a bank. However, digital banks are generally the online-only version of an established and regulated bank. Hence, industry experts tend to use neo-banks, bank challengers, and alternative digital banking to describe Fintech firms that provide digital and mobile financial solutions, money transfers, and more.

Another difference touched upon previously is that neo-banks do not generally have their own licence, whilst digital banks do. Neo-banks benefit from the services of e-money licenced institutions and hold their funds in another regulated bank. As the financial landscape is shifting towards customer experience and satisfaction, a gap has developed between what the traditional banks offer and what customers expect. It is this segment that neo-banks are targeting with their products and services.

Neo-banks vs. traditional banks

The differences between neo-banks can be summed up in two key points: the licence and user-interface. The licence of a neo-bank and the licence of a traditional bank are generally different, the former having no banking licence whilst the latter having its own fully-fledged licence. The type of licence (or lack thereof) determines what services neo-banks provide themselves or through other banks, as well as the level of protection for your savings. Services, regulatory requirements, compliance, and the use of deposited funds all depend on the type of licence held. Neo-banks tend to position themselves differently to traditional banks in terms of their services. Traditional banks have a prestige and more formality to their services, whilst neo-banks tend to be more social, challenging the way business is done and making it fun along the way. Neo-banks have a different approach to customer services, quick sign-up forms, and automatic checks of credit history.

Some industry experts class neo-banks as a type of *direct bank*, meaning it is fully digital through the Internet (online banking) and/or a mobile app. This is in contrast to the centuries-old traditional banks, with physical bank branches in the countries they're based in, although most established banks also have online banking options today[55].

The following table highlights some of the differences between traditional banks and neo-banks:

	Traditional bank	**Neo-bank**
Service platform	Physical banking institution	Primarily digital, apps
Time established	Centuries ago	21st Century
Customer relationship	Long-term, tries to keep customers	Virtual, flexible, no long contracts
Support	In-person, telephone, online	Telephone, online, in-app
Fees	Complicated, ongoing costs	Transparent, few costs

Banking licence	Full	None, partial, or full
Bank branches	Yes	No
Approval processes	Lengthy, manual	Quick, automatic

Conventional Neo-Bank Case Study: Starling Bank[56]

Starling Bank is a conventional UK-based mobile bank which leverages Fintech, allowing it to provide innovative solutions and services. The story of Starling initiated in 2014 and incorporated as a limited company in 2014. By December 2015, a banking licence was officially submitted. January 2016 saw Starling raise £48 million. In July of 2016, the PRA granted a banking licence (with restriction). In October 2016, the first Mastercard debit card was used. The PRA lifted its restriction in April 2017, allowing Starling Bank to accept more than £50,000 of deposits in total. Since then, Starling has developed even further. Starling Bank offers access to the Faster Payments system through APIs. API stands for Application Programming Interface. APIs are software intermediaries that allow different applications to exchange data. Traditional banks are built on legacy software, whilst Starling is built in the cloud with RESTful open APIs that can be integrated into any existing platform or used to build new products and services, all the while ensuring compliance with most recent data privacy standards. Some of the services Starling Bank offers are as follows:

1. Card freezing: if a customer fears that their card is lost or stolen, the card can be frozen in-app.
2. Disable/restrict and block payments: a customer can disable chip and pin or contactless payments - similarly, certain types of spending can be blocked such as gambling.
3. Set saving goals: customers earn interest whilst saving with Starling.
4. Nearby payments: customers can send secure payments to nearby Starling Bank customers.
5. Settle up: customers can easily split payments with a settle up link.
6. Instant spending notification: customers receive instant real-time push notifications when there is a transaction.
7. Spending categorisation: funds are automatically categorised.
8. Roundup spending: customers can round up transactions to the nearest pound to save money.
9. Free cash withdrawals abroad: customers can withdraw free cash overseas. However, cash machines may have their own fees.
10. International money transfers: the app allows customers to send money transfers with a 0.4% fee and can pay a flat rate delivery fee of £5.50 for faster payment.
11. Marketplace: Starling Bank accounts can be integrated with other financial products.

Starling Bank offers the following bank accounts:

1. The personal account – This allows customers to get spending insights, saving goals, split the bill, earn interest, control their overdraft with a slider in-app, and give a connected card to a trusted person so they can make purchases on behalf of the customer.

2. The business account – Unlike other business accounts, not only are there no monthly fees, but the customer benefits from 24/7 in-app support, instant payment notifications, spending analytics, digital receipts, and separate spaces for separate costs, allowing one to save and set aside funds for other expenses.

3. Starling Kite – This is an account for young people aged 6-16. This grants parents and guardians more visibility and control. This account allows spending limits, card top-ups, setting where it can and cannot be used, instant payment notifications, and many other features.

4. The Euro account – This account allows one to hold, send, and receive Euros without any fees. It also allows 24/7 money transfers between GBP and EUR accounts.

5. The joint account – This is an account for two people to manage expenses together.

Of course, Starling Bank is not a Sharia certified bank and it does offer some non-Sharia-compliant services.

Sharia-Compliant Neo-Bank Case Study: Insha[57]

2018 saw Albaraka Turk, part of the Al Baraka Banking Group, launch its Insha app in Germany for a branchless and digital banking facility. Insha states the following benefits as a result of its branchless and tech-based product:

1. Maximum cost transparency

The use of Insha's core banking services is free of charge; additional services are charged with a low fee. They provide maximum transparency and provide full cost control.

2. Eco-friendly and sustainable

Insha is a digital banking service. Therefore, they don't use any paper but handle all transactions and correspondence online. This way, they suggest they are saving resources – and saving costs from clients.

3. Intuitive handling, versatile features

Insha's app is designed to impress with a large number of practical features. For example, it only takes a few clicks to reset your spending limits or to lock or unlock your debit card. Also, real-time messages notify you about all account activities.

4. Achieve savings goals successfully

Insha has a finance management service called inSave, allowing customers to set savings goals. The app provides detailed expense reports, allowing customers to see which month they spend the most, where, and how many times they shopped.

5. Multi-language interface

Insha's products and services are available in Turkish, English, and German.

6. Real people, no bots

Insha boosts its online-only infrastructure with having real people as customer service instead of bots.

7. Perfect data security

Insha's systems and infrastructure were developed by more than 300 IT specialists at Albaraka Turk bank. Insha processes all financial transactions via encrypted connections, thereby protecting your account and funds against unauthorized persons.

8. Cash withdrawal at ATMs

The personal insha card allows customers to withdraw money from any ATM worldwide. The app is configured to guide you to the closest ATM nearby.

9. More freedom, more flexibility

Insha allows one to easily access all important banking services via smartphone, anytime and anyplace.

10. Impressive design

Not only will the colourful design of our app and banking card bring more joy to your life; it will also attract appreciative glances from your friends, family, and business partners.

11. Account opening in less than 10 minutes

Insha claims it only takes 10 minutes to open an account! After activating an account, Insha dispatches a personal insha debit card.

12. Other features

Customers can transfer funds from their apps to all SEPA countries and to Turkey at any time. Other features include an ATM map, a "nearest mosque" locator, and a Zakat calculator.

13. Sharia Compliance

Insha has a Sharia compliance certificate from the Sharia board, where it states that the accounts work on a Mudaraba basis and interest-free finance principles.

Mudaraba is an investment partnership contract where the customer authorises the bank to invest their cash deposits with the bank. The customer may deposit or withdraw their funds at will. The Mudaraba funds are allocated by the bank to a deposit pool from where they are invested in an ethical and responsible manner. Accrued profits are usually shared periodically between the depositors and the bank based on a pre-agreed sharing ratio.

Sharia Compliance of Neo-banks

Neo-banks are similar to other financial providers when it comes to considering Sharia compliance.

Accounts

For Sharia compliance, any account offered by a neo-bank must be interest-free. Likewise, the neo-bank should not hold funds in any bank where it receives interest.

Services

Neo-banks tend to offer several services such as remittance, cashback, reward schemes, exchange rates, and charitable giving. Each service should be reviewed by a Sharia advisor to ensure that it is Sharia-compliant. Cashback schemes and reward schemes have the potential to be Sharia-compliant depending on the way they are structured.

Chapter 11: Banking-as-a-Service

What is "as-a-service"?

Anything-as-a-service, or XaaS, refers to the body of services available over the Internet via cloud computing as opposed to being provided locally, or on premises. XaaS is also called everything-as-a-service and anything-as-a-service. All these terms reflect on-demand cloud services. They include services such as software-as-a-service (SaaS), storage-as-a-service, desktop-as-a-service (DaaS), disaster recovery-as-a-service (DRaaS), network-as-a-service (NaaS), infrastructure-as-a-service (IaaS), platform-as-a-service (PaaS), and even emerging services such as marketing-as-a-service and healthcare-as-a-service.

Adopting cloud-based services brings cost efficiency and outsources all maintenance-related costs to third-party service providers. Furthermore, businesses can get access to personal resources by purchasing services from providers on a subscription basis. Traditionally, businesses would have to purchase the software, purchase the licence, pay for the security of the software and hardware, put time and money into server setups, continue maintaining it themselves, and at times store all the related hardware on site. For many businesses, not all hardware or software is used or required all the time; they are used infrequently or during peak business seasons. This results in several unnecessary costs, with security, storage, and maintenance being some of the larger ones. XaaS and cloud-based services changed all of this. They are similar to pay-as-you-go services. Businesses only need to pay when they need something. Businesses typically enter into a service level agreement (SLA), where the client and vendor have predefined services and service levels to understand what is provided and at which frequency. Businesses can add and subtract services with greater flexibility due to concepts such as resource pooling and rapid elasticity support[58].

Cloud services can be layered into three core services[59]:
1. Software-as-a-Service (SaaS);
2. Platform-as-a-Service (PaaS); and
3. Infrastructure-as-a-Service (IaaS).

Software-as-a-Service

SaaS is a plug-and-play type model which allows third-party providers to deliver services to other companies. It is one of the most common forms of cloud-based services. In SaaS, the user has very little to manage or maintain. Data usage and application maintenance is remotely managed by the third-party SaaS provider. SaaS is a ready-to-use service and therefore very easy to setup. It reduces the workload from the client's IT team, giving them time to focus on other issues. GSuite, Dropbox, Cisco WebEx, and GoToMeeting are all examples of SaaS.

Platform-as-a-Service

PaaS provides a framework upon which client developers can customise and build. PaaS is provided remotely via the Internet, but unlike SaaS, PaaS delivers a platform for software creation. Businesses can design and customise their own platform and applications. PaaS is more user-friendly and available at a lower cost than getting developers to build an end-to-end solution. Furthermore, PaaS can be scaled up or down depending on demand. Windows Azure and Google App Engine are examples of PaaS.

Infrastructure-as-a-Service

IaaS allows clients to lease hardware from third parties without having to buy, house, and maintain such hardware. They are essentially computing resources which are virtually delivered through a dashboard or API (Application Programming Interface). This facilitates the client to have control of the infrastructure and manage the applications. IaaS includes the delivery of storage, networking, servers, and processing power. Amazon Web Services and Google Computer Engine are two examples of IaaS.

Defining Banking-as-a-Service

Banking-as-a-Service (BaaS) is a rapidly emerging trend in the financial services industry, driven by advancements in technology, changing customer preferences, and the rise of fintech companies. BaaS refers to the provision of end-to-end banking services, such as account management, payments, and lending, through a modular, API-driven platform. This enables non-bank companies, fintechs, and other third parties to integrate financial services into their existing offerings, without the need to build their own banking infrastructure.

BaaS can be defined as an on-demand service that allows others to access financial services online. This is possible by banks granting access to third party service providers through the use of APIs. These third-party service providers can simply position themselves on top of the existing regulated infrastructure of the underlying banks, somewhat of a 'white-labelling' approach to financial services. Service providers have access to a menu of items and can select what they wish from the bank's menu. Hence, some have described BaaS as the deconstruction of banking into individual granular services to which one may subscribe. A manifestation of BaaS would be airlines and other non-bank businesses offering banking products and services such as mobile bank accounts, debit cards, loans, and payment services. This is possible through the bank's server interacting via APIs and webhooks with that of the airline. Customers can access banking services through the third party's website or app. Funds are in the underlying regulated bank and cannot be used by the third parties; hence, the regulatory requirements are not imposed on these third-party service providers. BaaS allows non-banks to become pseudo-banks with a few lines of code[60].

BaaS is built on the principle of providing financial services in a modular, flexible, and scalable manner, allowing companies to pick and choose the specific services they require. This is made possible through the use of APIs, which are standardised digital interfaces that facilitate the seamless exchange of data and services between different software applications.

By adopting a BaaS model, banks and financial institutions can expose their banking services to external partners, allowing these partners to integrate banking functionality into their own applications or platforms. This enables non-bank companies and fintechs to offer financial services to their customers, without the need to obtain a banking license or invest in building their own banking infrastructure.

Key Components of Banking-as-a-Service

Some of the key components of BaaS are as follows:

1. Modular Services: BaaS platforms provide a wide range of modular banking services, such as account creation and management, payments processing, lending, and compliance services, allowing companies to select the specific services they need.

2. API-Driven Architecture: APIs serve as the foundation of BaaS, enabling seamless integration of banking services into third-party applications and platforms. Standardised APIs ensure interoperability and ease of integration, fostering a more collaborative ecosystem.

3. White-Label Solutions: BaaS platforms often offer white-label solutions, allowing third-party companies to brand the banking services as their own and provide a consistent user experience for their customers.

4. Compliance and Regulatory Support: BaaS providers typically offer compliance and regulatory support, helping their partners navigate the complex regulatory landscape associated with financial services.

Benefits of Banking-as-a-Service

BaaS offers several benefits, including:

1. Faster Time to Market: BaaS enables non-bank companies and fintechs to quickly launch financial products and services without the need to build their own banking infrastructure or obtain a banking license, significantly reducing the time to market.
2. Cost Efficiency: By leveraging the infrastructure and expertise of BaaS providers, companies can access banking services at a fraction of the cost of building and maintaining their own infrastructure.

3. Increased Innovation and Competition: BaaS fosters innovation and competition in the financial services industry by making it easier for new entrants and smaller players to offer financial products and services, challenging the dominance of traditional banks.

4. Enhanced Customer Experience: BaaS allows companies to provide a seamless and integrated customer experience by incorporating financial services into their existing platforms and applications.

Challenges in Banking-as-a-Service

1. Data Security and Privacy: As with any API-driven ecosystem, ensuring robust data security and privacy is crucial to maintaining customer trust and mitigating risks associated with data breaches.

2. Regulatory Compliance: Navigating the complex regulatory landscape associated with financial services can be challenging for BaaS providers and their partners, requiring a deep understanding of the applicable regulations and the ability to adapt to changing regulatory requirements.

3. Scalability and Performance: As BaaS platforms grow and support more partners and services, ensuring scalability and performance becomes increasingly important to provide a seamless and reliable user experience.

Various BaaS offerings

BaaS allows non-banks to access specific banking capabilities such as:

- Pre-paid card and account services
- Payments
- Credit cards and associated account services
- Clearing and settlement (including agency banking)
- Core banking
- Card processing
- Lending

Some of the common BaaS providers are Railsbank, ClearBank, solarisBank, and Bankable.

BaaS Case Study: Railsbank

Railsbank is a UK-based start-up that was founded in 2016. It offers banking-as-a-service and banking-as-a-platform. Their platform allows companies to offer financial services.

Whether the company is part of the financial services sector or not, they can plug into the Railsbank platform and offer financial services. Some of the services are as follows:

- Issue ledgers: allows the storing of value, such as EUR, GBP, and gold, that can be credited or debited.
- Issue IBANs: the globally unique address of a ledger so it can be credited or debited by payment schemes.
- Issue cards: companies can issue their own Mastercard debit cards that can spend the funds held in ledgers.
- Receive money: allows the crediting of ledgers.
- Send money: allows the debiting of a ledger.
- Collect money: allows the withdrawal of funds from a bank account.
- Spend money: allows people to spend funds held in the ledger.
- Convert funds: allows the conversion of different assets held in ledgers.

Railsbank holds an E-money Institutions (EMI) license which is regulated by the UK's Financial Conduct Authority (FCA). Railsbank is also a principal card issuing license holder for Visa and Mastercard, a principal clearing member of UK Faster Payments and BACs, an indirect clearing license holder of SEPA, and a bank-grade SUPE member of SWIFT.

Railsbank offers companies the ability to become an agent of its EMI licence. This means that Railsbank takes care of the regulatory process and setup on their behalf. Railsbank offers various companies different pricing and subscriptions based on their needs and allows companies to plug-in and offer financial services.

Sharia Compliance of BaaS Providers

For a BaaS to be Sharia-compliant, the products and services must be structured to meet Sharia principles.

Services such as the issuance of ledgers, IBANs, receiving money, and collecting money from bank accounts do not pose a high Sharia non-compliance risk. Sharia non-compliance risks can potentially emerge in the different types of cards that are offered, interest payments (if any), late penalty fees, and foreign exchange protocols. Similarly, some BaaS providers offer consumer lending and SME lending. These products would have to be structured in a Sharia-compliant manner.

Open Banking

Open banking is often confused with Banking-as-a-Service, but they are fundamentally different. Although both models connect to non-banks via APIs, the reason for the

connection and integration is different. In BaaS, non-bank businesses integrate complete banking products and services into their own products. In open banking models, on the other hand, non-bank businesses merely use the bank's data for their products.

Open banking is a transformative movement in the financial services industry that leverages technology, data sharing, and innovative business models to create a more competitive, transparent, and customer-centric ecosystem. Driven by regulations and advancements in technology, open banking enables third-party providers (TPPs) to access customer data held by banks and financial institutions, with the customer's consent, to develop new financial products and services.

At the core of open banking lies the idea of empowering customers to have greater control over their financial data and the ability to share it securely with TPPs. This is made possible through the use of application programming interfaces (APIs), which are standardised digital interfaces that allow different software applications to communicate and share data with each other.

Banks and financial institutions are increasingly adopting open banking by implementing APIs that allow TPPs to access customer data, such as account information, transaction history, and payment details. This data can be used by TPPs to develop innovative financial products and services, such as personal finance management tools, account aggregation services, and more efficient payment solutions.

Key Components of Open Banking

1. Data Sharing: Open banking hinges on the secure sharing of customer data between banks and TPPs. This requires robust data protection measures, customer consent management, and adherence to data privacy regulations.

2. Standardised APIs: APIs serve as the backbone of open banking, enabling seamless data sharing between different systems. Standardised APIs help ensure interoperability and ease of integration, fostering a more collaborative ecosystem.

3. Regulatory Framework: A supportive regulatory framework is essential for the successful implementation of open banking. Regulations like the European Union's Revised Payment Services Directive (PSD2) and the United Kingdom's Open Banking Initiative have paved the way for open banking by mandating banks to provide TPPs with access to customer data, subject to customer consent.

Benefits of Open Banking

1. Enhanced Customer Experience: Open banking fosters innovation and competition in the financial services industry, resulting in a broader range of products and services tailored to individual customer needs. This translates to a more personalised and seamless banking experience.

2. Increased Competition and Innovation: By opening up customer data to TPPs, open banking creates a more level playing field for new entrants and smaller players to compete with established banks. This increased competition drives innovation and better offerings for customers.

3. Financial Inclusion: Open banking has the potential to improve financial inclusion by enabling the development of products and services that cater to underserved segments of the population, such as low-income individuals, small businesses, and those with limited access to traditional banking services.

4. Improved Financial Management: With access to a wider range of financial management tools and services, customers can make more informed financial decisions and gain better control over their finances.

Challenges in Open Banking

1. Data Security and Privacy: The sharing of sensitive customer data raises concerns about data security and privacy. Ensuring robust security measures and adherence to data protection regulations is crucial to maintaining customer trust and mitigating risks.

2. Standardisation and Interoperability: While standardised APIs are essential for the seamless integration of different systems, achieving widespread standardisation and interoperability remains a challenge, as different jurisdictions may adopt varying standards and regulations.

3. Consumer Awareness and Adoption: The success of open banking depends on consumer awareness and adoption. Educating customers about the benefits of open banking and addressing concerns about data privacy and security is essential for driving adoption.

Chapter 12: Insurtech and Takafultech

Defining Insurance

Insurance is a financial product sold by insurance companies to indemnify people against the risk of loss, damage, or theft. Insurance is generally defined as a commercial contract wherein one party (the insurer) agrees to indemnify another party (the insured), on the occurrence of a specified event, in exchange for premiums.

Defining Insurtech

The term 'Insurtech' is derived from the combination of two words — 'insurance' and 'technology' — and means the adoption of emerging technologies to improve industry efficiency and add value for customers. Insurtech refers to the use of innovative technologies and business models to disrupt and revolutionise the insurance industry. Driven by advancements in technology, changing customer preferences, and increased competition, Insurtech aims to enhance the efficiency of insurance processes, create more personalised insurance products, and improve the overall customer experience.

The accelerated use of technology in the insurance sector is disrupting and transforming product development, distribution, modelling, underwriting, claims, and administration practices in the insurance business. This has led to the birth of Insurtech, another development in Fintech. Insurtech is the technology disruption in the insurance sector which is revolutionising the creation, distribution, and administration of insurance businesses. Insurtech has introduced smartphone apps, wearables, claims processing tools, online policy handling, and automated processing services, providing the insurance sector with a greater user-experience and user-interface. Insurtech facilitates more efficient and effective means for collecting and analysing customer data, resulting in better customer experiences and customer satisfaction. The key focus of Insurtech businesses is to offer super-customised policies, social insurances, and the adoption of new channels of receiving data from Internet-enabled devices. This leads to bespoke premiums based on the behaviour and real activity of the policyholder. In fact, the entire Fintech industry is a manifestation of the shift from "product-centric" models to "customer-centric" models. This is being driven by changing consumer expectations and concurrent market and regulatory conditions, in tandem with technological advancements[61].

Insurtech now services both retail and commercial markets. However, Insurtech has not boomed as fast as other areas within Fintech. This can be ascribed to the following reasons:

- Insurance products face more scrutiny and are more regulated as opposed to other areas of the financial industry. Therefore, any Fintech start-up seeking to launch an insurance company would have many more barriers of regulation and compliance.
- The barriers to entry for insurance start-ups are generally manifold considering the capital requirements and ongoing prudential and supervisory requirements.
- Start-ups in the insurance space would be relying on established insurance providers' licences and are restricted in what they can offer.

The insurance industry has traditionally been characterised by complex processes, cumbersome paperwork, and a lack of transparency. Insurtech seeks to address these challenges by leveraging cutting-edge technologies, data analytics, and digital-first business models to transform the way insurance products are designed, underwritten, distributed, and serviced. By harnessing the power of technology, insurtech companies aim to create a more customer-centric insurance ecosystem that is efficient, transparent, and responsive to changing customer needs.

Key Technologies and Innovations in Insurtech

Insurtech is driven by emerging technologies, such as:

1. Big Data and Advanced Analytics: Insurtech companies use big data and advanced analytics to gain deeper insights into customer behavior, risk profiles, and market trends. This enables them to create more accurate pricing models, identify potential fraud, and develop more personalised insurance products tailored to individual customer needs.

2. Artificial Intelligence (AI) and Machine Learning: AI and machine learning are used to automate and streamline various insurance processes, such as underwriting, claims management, and customer service. By automating repetitive tasks and leveraging predictive analytics, Insurtech companies can improve efficiency, reduce human error, and enhance the overall customer experience.

3. Blockchain and Smart Contracts: Blockchain technology has the potential to revolutionise the insurance industry by providing a secure, transparent, and decentralised platform for storing and sharing data. Smart contracts, which are self-executing contracts with the terms of the agreement directly written into code, can be used to automate claims processing and payouts, reducing fraud and increasing efficiency.

4. Internet of Things (IoT) and Telematics: IoT devices, such as connected cars and wearable devices, can collect real-time data on user behavior and environmental factors, providing valuable insights for insurers. Telematics, which combines

telecommunications and informatics, allows insurers to offer usage-based insurance (UBI) products that reward customers for safe driving or other low-risk behaviors.

5. Digital Distribution Channels: Insurtech companies leverage digital distribution channels, such as mobile apps and online platforms, to offer insurance products directly to customers, bypassing traditional intermediaries like brokers and agents. This enables them to reduce distribution costs and provide a more seamless and convenient customer experience.

Insurtech Products

IoT and smart devices are the vanguard of Insurtech. IoT allows several devices, machines, sensors, organisations, and people to all be interconnected and share data. These things converse with one another without human intervention and are able to collect, store, and transmit large volumes of data. IoT devices include telematic sensors, location-based sensors, wearables, and personal devices. Telematic sensors installed in vehicles allow a better reading and gauging of car insurance data such as routes, distances travelled, speed of travel, driving performance, maintenance, and crash data. Location-based sensors are fitted into buildings and properties providing real-time data on motion, sound, temperature, humidity, water, energy use, and more. Smart thermostats, smart cameras, and alarms are some of the latest innovations in this space. In fact, some of these gadgets are responsive and call emergency services upon being triggered by anything programmed as a threat. Wearable and personal devices are generally designed to monitor health-related matters. Smart watches can now measure heart rates, steps, food consumption, calorie intake, weight loss, BMIs, and other metrics. IoT has allowed such devices to share real-time data on the policyholder's habits and health with insurance providers. This facilitates an ongoing risk profiling of the insured person, potentially leading to cheaper premiums and better deals.

Other products in the Insurtech space include pay-as-you-go policies and microinsurance. The charm of these products are in the rapid turnaround speeds and relatively shorter periods of time they can cover. The entire application is processed through mobile phone apps; the customer can supply all the relevant data by uploading them on to the platform. Furthermore, the insurance can be switched on and off like a light switch! Similar to the purchase of the policy, any claim processing will be automated and accessible through the mobile phone application. Generally the case handler is a bot. Indemnity is paid after successfully completing the claim's algorithm[62].

Distribution channels

Another area being disrupted by Fintech in the insurance sector is the distribution of insurance. The adoption of advanced technology is leading to disaggregation of the sector and removing unnecessary intermediaries. Thus, a more direct relationship is being formed

between the insured and the insurer, with the brokers no longer part of the picture. This allows insurers to be more responsive to the needs and demands of the customers, as well as making the process more cost-efficient and streamlined. This revolution is occurring through automated and self-directional platforms. Digital distribution models are advancing beyond the price comparison website model to encompass the sharing economy, P2P features, artificial intelligence (AI), robo-advice, machine learning, and advanced robotic process automation (RPA). These technologies allow for more control as well as a more personalised experience.

P2P digital platforms are a very interesting development in the insurance space. These platforms can significantly reduce costs by sharing insurance needs among a pool of people. People can create their own pool and come together to have a pooled insurance cover. The premium is calculated on the standard underwriting criteria per individual. Thereafter, it is aggregated and put towards the group's insurance costs and the group underwriting pool. Any claims made will be paid from the pool. When there is no claim and there is a surplus, it is distributed back to the pool members. Alternatively, it can be advanced to the next year's cover. If there are more claims in a given year and the pool is insufficient to cover the claims, the excess is covered by the insurer.

Another disintermediating tool is AI. Artificial intelligence processes and analyses consumer data through intelligent automated systems with a more human-like response and behaviour. AI allows that work which once depended on human intelligence to complete to now be outsourced to computers. AI is increasingly being deployed to serve customers through mobile applications chats, replacing humans in the sales department. AI could soon influence insurance portfolios and the monitoring of policies, potentially replacing legal and accounting personnel, leading to cost savings that can be passed down to customers.

Underwriting

Another area of Fintech which is shaping the financial sector is the advancement in data collection. "Big Data" and data analytics are increasingly being deployed to deliver more accurate and segmented underwriting outcomes such as pricing and risk assessments. Fintech is resulting in a paradigm shift within insurance underwriting. There is a discernible move from the protection of risk to the prevention of risk. Traditionally, underwriting would be a sum of responses from the insured person, historical data of claims, and risk modelling, all under the watchful eyes of actuaries to determine patterns and predict probable behaviour. Insurtech has brought about dynamism in the underwriting process by adding in Big Data collected through IoT, thereby disrupting classical models of underwriting and risk modelling. Big Data is resulting in the better pricing of policies, reduced losses, and better allocation of funds in reserves[63].

Administration and claims

IoT, AI, Big Data, and similar advancements have resulted in a more seamless and streamlined claims administration experience. AI customer services are being deployed increasingly in claims administration, payment of claims, customer services, and fraud detection. These chatbots are given human names and human faces to make them feel as real as virtually possible. Another area where AI is having an impact is in fraud detection, where calls are monitored for fraud-related stress signals. The AI is deployed to make sense of human emotion by evaluating facial expressions and spoken language.

Blockchain technology and smart contracts are being discussed much more and tested in various stages of the insurance journey. These Fintech applications have a potential use and disruptive capability in data sharing, know your customer (KYC), anti-money laundering (AML) and fraud prevention, claims processing, and general insurance record keeping. Blockchain and smart contracts could potentially play a role in the processing of claims. The claimants can submit all the required information in a smart contract and, when everything had been completed as required, the funds can be automatically released through the execution of the smart contract. This can assist in policyholders being paid sooner rather than later and reduce administrative costs for the insurer. Furthermore, blockchain can help keep data accessible in real-time for all the various parties involved in a claim and the insurance chain. Also, verified data and immutable information can help reduce the number of fraudulent claims, as data cannot be deleted, changed, or omitted from records.

Sharia Scholars' Opinion on Insurance

The majority of Sharia scholars have raised concerns regarding conventional insurance and highlighted Sharia non-compliance risks embedded within a contract of insurance. They are as follows:

1. Insurance contracts have an element of *Ribā*. Either the policyholder receives more than they pay as a premium when they have a successful claim, or the insurance company receives more in premiums than it pays out in claims. Since the contract is an exchange of premium for potential indemnity, it is contractually a cash-for-cash transaction of the same currency in varying amounts. This gives rise to *Ribā al-Nasi'ah,* as the settlement is not immediate. Furthermore, it also gives rise to *Ribā al-Fadhl* as the amount of the premium generally differs from the indemnity. Conventional insurance contracts are relegated to cash-for-cash transactions as 'risk' is not a valid sale item from a Sharia perspective. Hence, there is nothing other than cash on either side of the bargain.

2. Insurance contracts have major uncertainty (*Gharar*). Islam demands that contracts of exchange must not have major uncertainty; it should not be that the execution of an exchange is contingent on an uncertain event, such that the parties are left to wonder whether they will

gain anything from this exchange. A person should not have to part with their wealth for nothing in return. This upsets the balance in an exchange. Hence, this uncertainty manifests itself in insurance, whereby the policyholder might pay insurance for several years at large amounts without ever receiving anything in return. The protection provided against an event is uncertain in terms of it or when it may occur.

3. Insurance results in one party generally gaining at the expense of the other. Either the insured gains a larger indemnity than the amount they paid as premium, or the insurer gains a large sum of premiums from the insured without having to give anything in return. This type of setup is at odds with Sharia principles.

4. Commercial contracts wherein two parties stake their wealth whilst taking a view on the occurrence of an uncertain event falls within the ambit of betting (*Maysir*). In insurance, the parties take opposing views on the occurrence of an uncertain event for which they agree to exchange funds. Thus, the Sharia scholars consider insurance as a form of *Maysir*.

Defining Takaful

Takaful means mutual cooperation or joint guarantee. The Takaful Act enacted by Malaysia in 1984 defines takaful as follows:

"A scheme based on brotherhood, solidarity and mutual assistance, which provides for mutual financial aid and assistance to the participants in case of need whereby the participants mutually agree to contribute for the purpose."

Takaful is therefore a group of people coming together by contributing into a common pool. The monies in this fund are used to pay out to members of the pool who have been afflicted by certain events for which the members have mutually agreed to cover each other.

Takaful is generally set up in two-tier structures, whereby one tier is the pooled funds of the policyholders which is used to settle any claims. The second tier involves a Takaful operator engaged by the fund to underwrite, manage the pool, and engage in claims handling and investments of the pooled funds.

A very common Sharia structure for Takaful is a *Wakalah* agreement for underwriting services delivered by the Takaful Operator with a *Mudaraba* agreement for investment purposes.

Takafultech

Takafultech – also called Takatech – is the application of Fintech in Takaful.

TakafulTech, a blend of the words "takaful" and "technology," refers to the application of innovative technologies and business models to disrupt and revolutionise the takaful (Islamic insurance) industry. Driven by advancements in technology, changing customer preferences, and an increasing demand for Sharia-compliant financial products, TakafulTech aims to enhance the efficiency of takaful processes, create more personalised takaful products, and improve the overall customer experience.

The takaful industry, similar to its conventional insurance counterpart, has traditionally been characterised by complex processes, cumbersome paperwork, and a lack of transparency. TakafulTech seeks to address these challenges by leveraging cutting-edge technologies, data analytics, and digital-first business models to transform the way takaful products are designed, underwritten, distributed, and serviced. By harnessing the power of technology, TakafulTech companies aim to create a more customer-centric takaful ecosystem that is efficient, transparent, and responsive to changing customer needs while adhering to Sharia principles.

Although this appears to be the slowest growing area in the Islamic Fintech industry, there are many exciting developments in which this sector might embrace technology. Takaful firms can adopt the following six trends to really boost and grow their offerings[64]:

1. AI and machine learning

The insurance industry is embracing chatbots as a whole. Takafultech will begin to infuse chatbots in their service delivery, allowing services to be more cost-efficient and streamlined. Similarly, AI will be assisting throughout the Takaful value chain from purchasing and managing investments, to underwriting surplus and claims management. Furthermore, machine learning and AI will assist Takaful firms to mitigate fraudulent claims, increase KYC checks, and automate a lot of the claims processing cycle.

2. IoT

The interconnectedness of devices through IoT will allow Takaful providers to be more competitive and begin to engaged with mainstream providers. The data gathered in real-time from wearables, smart appliances, and telematics will provide more accurate risk assessments and better risk modelling.

3. Robotic Process Automation (RPA)

RPA is another exciting development in the insurtech sector. RPA allows companies to automate repetitive tasks which are done frequently. This reduces costs of labour and allows for more efficient services, as well as cost savings, through economies of scale. RPA also shows huge promise in accelerating onboarding, policy renewals, and claims management.

RPA is a huge opportunity for Takafultech to reduce costs and allow greater reach to customers and markets.

4. Blockchain

Blockchain has the potential to change the landscape of how various parties in Takaful interact among themselves. The adoption of blockchain will bolster data security and enhance trust among different parties involved in Takaful. This will undoubtedly reduce costs and allow for more competitive pricing and growth of the Takaful sector.

5. Advanced analytics

Data analytics can play a huge role in Takaful. Advanced analytics will give more information on customer needs, allow better services to be more responsive to customer needs, and enable them to facilitate faster claims settlement. The overall benefit of advanced analytics is in allowing Takafultech to be more competitive and efficient.

6. Smart products, drones, and other

Smart products and wearables are changing the way data is being collected. These products can change the way Takaful operates and performs underwriting. One such product is the drone. Drones can be used to examine and inspect high-risk areas, as well as perilous situations and accidents. Any insured item can be reviewed remotely through the use of these drones. Similarly, drones can be used to validate and authenticate claims, as well as supply information in complex insurance contracts and arrangements.

Benefits of TakafulTech

Takaful has the following potential benefits:

1. Enhanced Customer Experience: By leveraging technology and digital-first business models, TakafulTech companies can offer a more seamless, transparent, and personalised customer experience, making it easier for customers to find, purchase, and manage their takaful policies.

2. Increased Efficiency: TakafulTech innovations can streamline various takaful processes, such as underwriting, claims management, and customer service, improving efficiency and reducing operational costs.

3. Personalised Takaful Products: By harnessing the power of data analytics and advanced technologies, TakafulTech companies can develop more personalised

takaful products that cater to individual customer needs and risk profiles while remaining compliant with Sharia principles.

4. Improved Risk Management: TakafulTech innovations, such as big data and advanced analytics, can provide insurers with valuable insights into customer behavior and environmental factors, enabling them to better manage risk and create more accurate pricing models.

Challenges in TakafulTech

TakafulTech has some of the following challenges:

1. Regulatory Compliance: TakafulTech companies must navigate the complex regulatory landscape associated with the takaful industry, ensuring compliance with various laws and regulations governing Sharia principles, consumer protection, and solvency requirements. Adapting to changing regulatory requirements and maintaining compliance can be challenging, particularly for startups with limited resources.

2. Data Security and Privacy: The collection, storage, and analysis of large volumes of sensitive customer data present significant data security and privacy challenges for TakafulTech companies. Ensuring robust security measures and adherence to data protection regulations is crucial to maintaining customer trust and mitigating risks associated with data breaches.

3. Integration with Legacy Systems: Many established takaful operators still rely on legacy systems and processes, which can make it difficult to integrate TakafulTech innovations seamlessly. Overcoming integration challenges and modernising outdated systems is essential for takaful operators looking to capitalise on TakafulTech opportunities.

4. Customer Adoption: Despite the many benefits of TakafulTech, customer adoption remains a key challenge. Educating customers about the advantages of TakafulTech solutions and addressing concerns related to data privacy and security is essential for driving adoption and realising the full potential of TakafulTech innovations.

Case Study: Grab Insurance

Grab is a smartphone-based transport booking platform that started in Malaysia as MyTeksi to revamp the taxi and transport industry. Grab – in partnership with 14 leading insurers and Takaful operators – has recently launched a new digital takaful coverage, the Grab Daily Insurance (GDI). Many of the Grab drivers are part-time and supply this service as a means

of supplementary income. New e-hailing regulations require drivers to purchase an e-hailing insurance/takaful, an add-on to their existing motor insurance/takaful which may cost up to RM400-500 upfront for the year. GDI will help address this upfront burden via a flexible, affordable daily coverage. GDI allows drivers to opt-in for daily insurance/takaful coverage while deducting from their GrabPay Credit wallet seamlessly. Drivers will only need to pay for insurance/takaful when they come online and it will be valid for 24 hours. All rides within that period will be covered by the e-hailing insurance.

GDI works in the following manner:

1. Opt-in on the mobile application via one's smartphone

The Takaful cover is available to all driver-partners. Drivers will need to sign-up to GDI within their app.

2. Pay-as-you-go through the GrabPay Driver's wallet

Once Grab drivers sign-up via the mobile application, their premiums will be deducted from their wallet every 24 hours. Daily rates can change, depending on the Takaful provider.

3. Drive with Takaful cover

This flexible pay-as-you-go Takaful cover allows drivers to work with more efficient costs. Once the GDI is active, the drivers' wallets are only deducted when they go online and work. GDI helps driver-partners to retain their flexibility of working at any time with no minimum trip requirement per day, staying protected until their policies expire. The policy covers loss or damage to vehicles, liability to passengers and third-parties, and provides personal accident coverage for these driver-partners while they are operating as an e-hailing driver with Grab[65].

Chapter 13: ZakatTech

The proponents of blockchain technology project that it could account for as much as 10% of global GDP by 2025[66]. Whilst much of the focus for Blockchain has been on payment systems for commercial use, clearance, settlement, and securities trading, the potential benefits of blockchain for social finance and charitable giving is under-developed and limited.

As discussed earlier, blockchain is a shared, distributed ledger that facilitates the process of recording transactions and tracking assets in a network. An asset can be tangible — a house, a car, cash, land — or intangible, like intellectual property such as patents, copyrights, or branding. Virtually anything of value can be tracked and traded on a blockchain network, reducing risk and cutting costs for all involved. For a Zakat ecosystem, blockchain has potential benefits for all, including the payers, beneficiaries, and the Zakat management body.

Distributed Ledger Technology (DLT) can have the following potential benefits for Zakat payments:

1. Transactions at Higher Speed

Transaction speed refers to the rate at which the transfer of data happens from one account to the other. DLT has the potential to improve transaction speeds because the technology cuts many of the unnecessary intermediaries out of the equation. The shorter the supply chain, the fewer unnecessary transactions there are. A Zakat system on a blockchain has the potential to exchange value at higher speeds. This can ensure that a Zakat payer's obligation is fulfilled faster than ever before. However, at present, scalability is an issue for blockchain technology and transaction speeds are not as optimal as some traditional platforms. VisaNet claims it can process 56,000 electronic transaction messages per second - something which blockchain based transactions are struggling to match[67].

2. Reduced Operational Costs

As no intermediaries are required to mediate the transactions, in theory operational costs are lower and more money is available for the organisation to improve their structure and support those in need of assistance. This can help to significantly decrease the cost of annual reporting on the Zakat institution's budget and spending, while increasing its overall transparency. Furthermore, the automation of processes by use of smart contracts can reduce administrative costs for charities. Blockchain can dramatically improve how they manage, monitor, and identify issues with budget allocation, or find a project’s inadequacy to tackle a problem and, consequently, improve their results.

3. Transparency in a Zakat Ecosystem

Fraud in the charity sector costs British charities and charitable trusts approximately £1.65 billion per year, according to a new report released by the Centre for Counter Fraud Studies at the University of Portsmouth and accountancy firm BDO[68].

One of blockchain's most attractive features for Zakat is that Zakat movement around an ecosystem would be highly visible and traceable, allowing payers to track all their payments from beginning to the end and verify where their funds went. A clear audit trail is developed, manifesting exactly where every single penny is spent. Every Zakat transaction on the blockchain would be recorded in near real-time and would be visible to everyone on the network. Such transparency will increase the trust in Zakat institutions; by monitoring the entire sequence of transactions, givers can easily find out whether their funds reached their intended target. Well-documented and tracked transactions enable givers to make better informed decisions when choosing between various charitable organisations for their future donations.

4. Improving Accounting and Governance of Zakat Institutions

The nature of a distributed ledger and the consensus model that governs it ensures that all transactions are secure and accounted for. Since each transaction builds onto the blockchain, there is no way for it to be manipulated. Zakat payers can rest assured knowing that their donations are being used for their intended purpose. Smart contracts can be created at the time of a Zakat payment, giving the Zakat payer peace of mind that their Zakat is being used as intended. The contract is embedded in the digital code and stored in transparent, shared databases. This allows the giver to see where their money has gone from the moment they give, all the way through to the receiver. It also allows the money to only be released for the cause it was originally intended for, as well as only to approved suppliers of goods and services. This will enhance the overall governance of Zakat institutions.

5. Efficiency of Zakat Operations

Blockchain has the potential to offer a secure, reliable, and efficient way to manage donations and allow for efficient workflows. With the use of smart contracts, organisations don't have to rely on intermediaries to confirm transactions and can proceed faster than they would in the traditional workflow model.

6. Better Cyber Security

DCMS' Cyber Security Breaches Survey 2018 found that 19 per cent of the 555 charities that responded had suffered a cyber breach or attack in the past year, compared to 43 per cent of businesses[69]. An increasingly pertinent advantage of blockchain technology is to repel cyber-

attacks and forced outages. Hackers would not only need to hack into a specific block to alter existing information, but would have to access all of the preceding blocks going back through the entire history of that blockchain - across every ledger in the network - simultaneously. With no central organisation owning the system, it is difficult to corrupt and everybody can use it and help run it. This feature would enhance the resilience of Zakat organisations and ensure that Zakat payers' obligations are fulfilled.

7. Reduce Risk of Identity Fraud

Blockchain can ensure that Zakat payments are made to the right people deserving of Zakat. The UN's blockchain pilot program, Building Blocks, was instrumental in displaying this. With a biometric scan, they can distribute electronic food vouchers to refugees in Jordan, eliminating the risk of identity fraud or data mismanagement[70].

8. Efficient Identification

Where Zakat is distributed in more developed societies, Blockchain has the ability to eliminate the hurdles of time in identification and verification (ID&V) and KYC. A secure, distributed ledger can transform the speed of ID&V and help to piece together the financial status and ID of a Zakat applicant.

Challenges for Zakat Management on Blockchain

Whilst blockchain has a lot of growth potential, the technology is still in its infancy and faces a number of real challenges. Deloitte have identified five challenges facing blockchain technology[71]. The principal challenge associated with blockchain is a lack of awareness of the technology, especially in sectors other than banking, and a widespread lack of understanding of how it works. These limit the use and investment in blockchain.

Another challenge for blockchain technology is the lack of cooperation among organisations. This defeats the purpose of distributed ledgers, fails to harness network effects, and can be less efficient than current approaches. Blockchain creates most value for organisations when they work together on areas of shared pain or shared opportunity – especially problems particular to each industry sector.

The third challenge for blockchain is culture shift. A blockchain represents a total shift away from the traditional ways of doing things – even for industries that have already seen significant transformation from digital technologies. It places trust and authority in a decentralised network rather than in a powerful central institution. For most, this loss of control can be deeply unsettling. Thus, Zakat institutions would need to embrace a complete culture shift for blockchain to thrive in Zakat management.

Another challenge for blockchain is speed and effectiveness. The speed and effectiveness with which blockchain networks can execute peer-to-peer transactions comes at a high aggregate cost, which is greater for some types of blockchain than others. This inefficiency arises because each node performs the same tasks as every other node on its own copy of the data in an attempt to be the first to find a solution. A fifth challenge for blockchain technology is regulation and governance. The current governance infrastructure for charities would need to update regulatory systems to capture the advances in technology.

Chapter 14: The Future of Islamic Fintech

Islamic Fintech is currently in its infancy, but there are a lot of potential growth opportunities. We will be witnessing immense growth in the following areas:

1. Sharia-compliant Halal Crowdfunding and P2P Financing

The concept of crowdfunding using peer-to-peer (P2P) models is ever evolving and is being used in increasingly creative ways. It is a platform where like-minded individuals or entities can collaborate collectively using technology-based platforms to support each other's needs. Crowdfunding has seen several Sharia structures used to invest in numerous investments and charitable avenues. There will be more crowdfunding platforms launching in the coming years, using innovative Sharia structures and investing more in the Islamic economy.

2. Sharia-compliant WealthTech – Halal Wealth Management

Islamic WealthTech companies are advancing the investment and wealth management profession, offering varied solutions and platforms ranging through full-service brokerage alternatives, automated and semi-automated robo-advisors, self-service investment platforms, asset class specific marketplaces, and investing tools for both individual investors and advisors. Sharia-compliant AI advisors and wealth management platforms including robo-advisors, robo-retirement platforms, micro-investing platforms, digital brokerage platforms, investing tools, and portfolio management will be another area of growth in the next decade.

3. Sharia-compliant PayTech, Digital Wallet, and Payment Services

There will be more Sharia-compliant PayTech solutions which are seamlessly integrated into smartphones and other wearables, allowing smooth contactless payments in a Sharia-compliant process. This is another area of growth in the Islamic Fintech industry.

4. Sharia-compliant Alternative Financing

There are a number of emerging Sharia-compliant alternative financing channels emerging which are leveraging Fintech to deliver their services. This seems to be an easier route than opening an Islamic bank; hence, we will see many Sharia-compliant offerings through alternative financing.

5. Sharia Data Analytics & Predictive Analytics

Data Analytics is increasingly being deployed in the Islamic finance sector. We will need to see more of this to decipher raw data, uncover patterns, and extract valuable insights from it.

Sharia-compliant service providers are already leveraging data analytics and predictive analytics to better serve the Islamic economy and customers.

6. Sharia-compliant Bank Challengers & Banking-as-a-Service

There are a number of bank challengers which have manifested in the year 2020. As more countries develop their Fintech regulation, there will be more such bank challengers offering micro-Sharia-compliant banking services and windows.

7. Sharia-compliant Digital Money Managers

Another area of Islamic Fintech is Digital Money Managers. The personal finance management (PFM) market has developed rapidly in recent years because banks have rarely tapped into this opportunity of helping customers manage their money. With the rise of Fintech and the introduction of open banking, DMMs have emerged. DMMs are now providing customers with many more options to manage their money digitally.

9. Sharia-compliant TradeTech

Islamic TradeTech involves the application of information technology to reduce the information costs of Sharia-compliant international trade. TradeTech can reduce transaction costs, increase transparency for firms, regulators, and consumers, facilitate trade finance, and significantly lower regulatory and tariff compliance burdens. There is huge potential in Sharia-compliant trade financing to harness the technological development and offer more Sharia-compliant products at scale.

10. Payment Remittance

Payment remittances via a Sharia-compliant channel is another area of growth for Islamic Fintech. Sharia-compliant providers are deploying Fintech to increase speed, lower costs, increase transparency, and add extra flexibility to the remittance market.

11. Blockchain

Islamic Fintech is seeing the rise of blockchain and distributed ledger technology to enhance operations and businesses. Blockchain adoption is increasing year-on-year and more Islamic financial institutions will certainly analyse blockchain and the benefits it can offer.

12. Cryptocurrencies

The Islamic Fintech market has had a mixed response to cryptocurrencies. However, there are a number of Islamic Fintech firms raising funds through cryptocurrencies which are also

using smart contracts. The COVID-19 economic crisis may lead to more cryptocurrency adoption and exploration in the Islamic finance industry.

13. TakafulTech

An emerging area in Islamic Fintech is TakafulTech. At present, TakafulTech is very limited. However, with advancements in Malaysia in this space, there seems to be a lot of enthusiasm to accelerate TakafulTech in other parts of the world.

14. Islamic RegTech

Islamic RegTech has not completely taken off yet. However, it is something on the horizon and will definitely take shape sooner or later. Islamic RegTech can be defined as the use of new technologies to solve Sharia regulatory and compliance requirements more effectively and efficiently.

15. CharityTech and ZakatTech

A number of charities have already started to accept Bitcoin donations. Furthermore, several companies have revealed plans to understand how blockchain can be deployed in tracing Zakat and enhancing the transparency and governance in Zakat.

Conclusion

This book has been a *tour de force* of Islamic Fintech to give beginners a place to start from in exploring this vast and exciting subject. As we discussed in Chapter 1, Islamic Fintech is the use of financial technology through the lens of a specific framework and worldview. Fintech is not new in any measure or stretch; finance and technology have been cooperating for many centuries. It was in the in the 19th century that the world really began to boom with Fintech; more and more financial institutions were adopting the technological revolution as we discussed in Chapter 2. Blockchain, crypto-assets, smart contracts, alternative finance, crowdfunding, investment technologies, neo-banking, BaaS, Takafultech, and Zakattech are all worlds within Islamic Fintech. Each area is growing and there is much more to come in the near future. We are entering a decade full of promise and, by the end of this decade, Islamic Fintech will have morphed into a profound offering to the world. Amanah Advisors will continue to research and develop education in Islamic Fintech, contributing to the Islamic Fintech world with further publications in the coming years.

Bibliography

[1] Finextra Research. (2016). *What is FinTech and where does it Live?* [online] Available at: https://www.finextra.com/blogposting/12890/what-is-fintech-and-where-does-it-live.
[2] LNMHacks (2018). *Financial Technology*. [online] Medium. Available at: https://medium.com/@LNMHacks/financial-technology-b6ee47cc54ad.
[3] Mohamed, H. and Ali, H. (2019). *Blockchain, Fintech, and Islamic Finance: Building the Future in the New Islamic Digital Economy*. [online] *www.degruyter.com*. De Gruyter. DOI: https://doi.org/10.1515/9781547400966.
[4] Elipses. (2019). *The Global Islamic Fintech Report.* [online] Available at: https://ceif.iba.edu.pk/pdf/IslamicFinTechReport19.pdf.
[5] PwC. (2016). Questions and Answers FinTech. [online] Available at: https://pwc-financial.relayto.com/e/questions-and-answers-fintech-b0zaegbp.
[6] Homann, M. (2020). *What Is RegTech? - A Definition*. [online] EQS Group. Available at: https://www.eqs.com/en-us/compliance-knowledge/blog/what-is-regtech/.
[7] Yaacob, S.E. (2014). The Ruling of Paper Money Usage: Analysis Based on the Evolution of Currency Development. *Asian Social Science*, 10(3).
[8] British Embassy. (2015). *Islamic Finance in the UK.* [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/503491/2015047_Is_Fin_A5_AW_ENG_WEB.pdf.
[9] GIFR. (2017). *Islamic Finance in The Digital Age: Fintech Revolution.* Global Islamic Finance Report.
[10] CFC Underwriting. (n.d.). *Top 5 risks for FinTech businesses*. [online] Available at: https://www.cfcunderwriting.com/resources/articles/2019/11/top-5-risks-for-fintech-businesses/.
[11] Rosic, A. (2016). *What is Blockchain Technology? A Step-by-Step Guide For Beginners*. [online] Blockgeeks. Available at: https://blockgeeks.com/guides/what-is-blockchain-technology/.
[12] Tapscott, D. and Tapscott, A. (2018). *Blockchain revolution : how the technology behind bitcoin and other cryptocurrencies is changing the world*. New York, New York: Portfolio/Penguin.
[13] TechJury. (2019). *What Is Cryptographic Hash? [a Beginner's Guide]*. [online] Available at: https://techjury.net/blog/what-is-cryptographic-hash/#gref.
[14] Darius, R. (2016). *4 Blockchain Technology Features*. [online] Due. Available at: https://due.com/blog/4-features-blockchain-technology.
[15] KPMG. (2016). Consensus Immutable agreement for the Internet of value. [online] Available at: https://assets.kpmg/content/dam/kpmg/pdf/2016/06/kpmg-blockchain-consensus-mechanism.pdf?aid=fndrabg_p?aid=fndrabg_p.
[16] Thake, M. (2020). *What is Proof of Stake? (PoS)*. [online] Medium. Available at: https://medium.com/@maxthake/what-is-proof-of-stake-pos-479a04581f3a.
[17] Jimi S (2018). *How does blockchain work in 7 steps—A clear and simple explanation.* [online] Medium. Available at: https://blog.goodaudience.com/blockchain-for-beginners-what-is-blockchain-519db8c6677a.
[18] Ibn Nijaym, Z.A. (2011). *Al Ashaah wa'n nadhair.* Beirut: Al maktabah al Asariyyah.
[19] DeepDive Blockchain (ASTERI). (n.d.). *What is blockchain technology?* [online] Available at: https://www.deepdive.tech/what-is-blockchain-technology.
[20] www.kaleido.io. (n.d.). *What are Smart Contracts and How Do they Work?* [online] Available at: https://www.kaleido.io/blockchain-blog/what-are-smart-contracts-and-how-do-they-work.
[21] Perez, Y.B. (2019). *The differences between cryptocurrencies, virtual, and digital currencies*. [online] Hard Fork | The Next Web. Available at: https://thenextweb.com/hardfork/2019/02/19/the-differences-between-cryptocurrencies-virtual-and-digital-currencies.
[22] FCA. (2013). *FCA Handbook*. [online] Available at: https://www.handbook.fca.org.uk/handbook/PERG/3A/3.html.
[23] Habib & Adam. (2019). *Sharia Analysis of Crypto-Assets*. Global Islamic Finance Report 2019.

[24] Haeems, A. (2018). *What is a crypto-asset?* [online] Medium. Available at: https://medium.com/babb/what-is-a-crypto-asset-1f0fcc517887.
[25] E&Y. (2018). *Accounting for Crypto-Assets.* [online] Ernst & Young. Available at: https://www.ey.com/Publication/vwLUAssets/EY-IFRS-Accounting-for-crypto-assets/$File/EY-IFRS-Accounting-for-crypto-assets.pdf.
[26] FCA. (2019). *Guidance on Cryptoassets*. [online] Financial Conduct Authority. Available at: https://www.fca.org.uk/publication/consultation/cp19-03.pdf.
[27] PwC. (2018). In depth - A look at current financial reporting issues. [online] Available at: https://www.pwc.com/gx/en/audit-services/ifrs/publications/ifrs-16/cryptographic-assets-related-transactions-accounting-considerations-ifrs-pwc-in-depth.pdf.
[28] cryptonews.com. (n.d.). *What Is A Security Token Offering (STO)?* [online] Available at: https://cryptonews.com/guides/what-is-a-security-token-offering-sto.htm.
[29] Rosic, A. (2019). *What is An Initial Coin Offering? Raising Millions In Seconds*. [online] Blockgeeks. Available at: https://blockgeeks.com/guides/initial-coin-offering/.
[30] Islam, M.W. (1999). Al-Mal: The Concept of Property in Islamic Legal Thought. *Arab Law Quarterly*, [online] 14(4), pp.361–368. Available at: https://www.jstor.org/stable/3382152.
[31] Uthmani, T. (2014). *Fiqh al-Buyu*. Karachi: Maktabah Ma'arif al-Qur'an.
[32] Hayder, A. (2003). *Durar al-Hukkam Sharh Majallah al-Ahkam*. Beirut: Dar alam al-Kutub.
[33] al-Zarkashi. (n.d.). *Al Manthur fi al-Qawa'id al-Shari'yyah*. Beirut: Dar al-Kutub.
[34] Zarqa, M.A. (1999). *al-Madkhal ila Nazariyyat al-Iltizam al-Aammah*. Damascus: Dar al-Qalam.
[35] Binance Academy. (n.d.). *What Is an ICO (Initial Coin Offering)?* [online] Available at: https://www.binance.vision/economics/what-is-an-ico.
[36] i4consulting.org. (n.d.). *ICO Development*. [online] Available at: http://i4consulting.org/ico-development-company.
[37] ZODIAQ (2018). *What is ICO and what rounds of fundraising are there?* [online] Medium. Available at: https://medium.com/@ZODIAQ/what-is-ico-and-what-rounds-of-fundraising-are-there-4ce836d53271.
[38] Zamagna, R. (2020). *What is a Security Token Offering (STO)?* [online] Medium. Available at: https://medium.com/datadriveninvestor/what-is-a-security-token-offering-sto-1758e14a3b52.
[39] Mappo (2019). What is an STO & How is it Different from an ICO? *Medium*. [online] 1 Feb. Available at: https://medium.com/aelfblockchain/what-is-an-sto-how-is-it-different-from-an-ico-daf5fd2c17d1.
[40] Binance Academy. (n.d.). *Initial Exchange Offering (IEO)*. [online] Available at: https://www.binance.vision/glossary/initial-exchange-offering.
[41] Cryptonews (n.d.). *What Is An Initial Exchange Offering (IEO)?* [online] Available at: https://cryptonews.com/guides/what-is-an-initial-exchange-offering.htm.
[42] SAC Resolutions. (n.d.). *Resolutions of the SC Sharia Advisory Council - Islamic Capital Market | Securities Commission Malaysia*. [online] Available at: https://www.sc.com.my/development/islamic-capital-market/resolutions-of-the-sc-Sharia-advisory-council.
[43] Cointelegraph. (n.d.). *New Study Says 80 Percent of ICOs Conducted in 2017 Were Scams*. [online] Available at: https://cointelegraph.com/news/new-study-says-80-percent-of-icos-conducted-in-2017-were-scams.
[44] LendingCrowd. (n.d.). *Alternative Finance*. [online] Available at: https://www.lendingcrowd.com/alternative-finance.
[45] Cushion, I. (n.d.). *The 4 types of asset finance and when you should use them*. [online] White Oak. Available at: https://www.whiteoakuk.com/blog/4-types-of-asset-finance.
[46] Bridge, R. (2013). *How invoice finance works: Discounting & factoring for UK Businesses*. [online] Entrepreneur Handbook. Available at: https://entrepreneurhandbook.co.uk/invoice-finance/.
[47] Manzil. (n.d.). *Ethical Islamic Finance & Investment Products*. [online] Available at: https://manzil.ca/.
[48] P2PMarketData. (2019). *Crowdfunding Explained: The Ultimate Guide to Crowdfunding*. [online] Available at: https://p2pmarketdata.com/crowdfunding-explained/.
[49] Alois, JD. (2018). *The UK Financial Conduct Authority Looks to Update Rules for Loan Based Crowdfunding which is "Increasingly Complex," Opens New Consultation*. [online] Crowdfund Insider. Available at:

https://www.crowdfundinsider.com/2018/07/137015-the-uk-financial-conduct-authority-looks-to-update-rules-for-loan-based-crowdfunding-which-is-increasingly-complex-opens-new-consultation/.
[50] Islamic Fintech Report 2018 Current Landscape & Path Forward. (n.d.). [online] Available at: https://www.dinarstandard.com/wp-content/uploads/2018/12/Islamic-Fintech-Report-2018.pdf.
[51] Deloitte. (2020). *Driving Innovation in Investment Management.* [online] Deloitte Center for Financial Services. Available at: https://www2.deloitte.com/content/dam/Deloitte/ie/Documents/FinancialServices/ie-driving-innovation-invest-tech.pdf.
[52] O'Shea, A. (2017). *What Is a Robo-Advisor and Is One Right for You?* [online] NerdWallet. Available at: https://www.nerdwallet.com/blog/investing/what-is-a-robo-advisor/.
[53] Al-Maghribi (1119 AH), *al-Badr al-Tamam Sharh Bulugh al-Maram*, Dar Hijr.
[54] BCC UK. (2020). *E-money | Electronic Money Institution | Licencing & Compliance | UK*. [online] Available at: https://www.buckinghamcapitalconsulting.com/authorised-emi-uk.
[55] https://www.mobiletransaction.org (2019). *What is a neobank? How does it differ from traditional banks?* [online] Mobile Transaction. Available at: https://www.mobiletransaction.org/what-is-a-neo-bank/.
[56] Starling Bank. (2019). *Better banking with our mobile bank accounts - Starling Bank*. [online] Available at: https://www.starlingbank.com/.
[57] Insha. (n.d.). *insha - Your account with principles*. [online] Available at: https://www.getinsha.com/en/.
[58] Sam Solutions. (2019) *Everything-as-a-Service (Xaas): Definition.* [online] Available at: https://www.sam-solutions.com/blog/everything-as-a-service-xaas-definition-and-examples/.
[59] IBM. (2019). *IaaS PaaS SaaS Cloud Service Models*. [online] Available at: https://www.ibm.com/uk-en/cloud/learn/iaas-paas-saas.
[60] internationalbanker (2020). *Banking as a Service (BaaS): the Platform Approach to Banking*. [online] International Banker. Available at: https://internationalbanker.com/banking/banking-as-a-service-baas-the-platform-approach-to-banking/.
[61] Accenture. (2017). *THE RISE OF INSURTECH.* [online] Available at: https://www.accenture.com/t00010101T000000__w__/gb-en/_acnmedia/PDF-50/Accenture-Insurtech-PoV.pdf.
[62] Norton Rose. (2020). *InsurTech: where are we now? | Global law firm | Norton Rose Fulbright*. [online] Available at: https://www.nortonrosefulbright.com/en-gb/knowledge/publications/db154724/insurtech-where-are-we-now.
[63] McKinsey&Company. (2016). *The New Picture in Finance.* [online] Available at: https://www.mckinsey.com/~/media/mckinsey/industries/financial%20services/our%20insights/bracing%20for%20seven%20critical%20changes%20as%20fintech%20matures/fintechnicolor-the-new-picture-in-finance.ashx.
[64] Tomych, I. (n.d.). *Introduction to Insurtech.* [online] Available at: https://tinyurl.com/76bd244x.
[65] Grab. (n.d.). *Daily Insurance - ENG*. [online] Available at: https://www.grab.com/my/daily-insurance/.
[66] World Economic Forum. (2018). Building Block(chain)s for a Better Planet. [online] Available at: http://www3.weforum.org/docs/WEF_Building-Blockchains.pdf.
[67] Strelenko, O. (2018). *Blockchain and Transaction Speed: Why Does it Matter?* [online] Medium. Available at: https://medium.com/@s_o_s/blockchain-and-transaction-speed-why-does-it-matter-80bfd100fa89.
Visa. (n.d.). *VisaNet | Electronic Payments Network*. [online] Available at: https://www.visa.co.uk/about-visa/visanet.html.
[68] Markel Direct. (2011). *UK charities lose £1.65bn annually due to fraud | Markel Direct UK*. [online] Available at: https://www.markeluk.com/articles/charities-lose-1.65bn-year-due-to-fraud.
[69] Preston, R. (2018). *Fifth of charities suffered cyber attacks last year*. [online] Available at: https://www.civilsociety.co.uk/news/fifth-of-charities-suffered-cyber-attacks-last-year.html.
[70] Barclays (n.d.). *What does Blockchain do? | Barclays Corporate*. [online] Available at: https://www.barclayscorporate.com/insights/innovation/what-does-blockchain-do/.

[71] Deloitte. (n.d.). *Key Challenges.* [online] Deloitte Center for Financial Services. Available at: https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/Innovation/deloitte-uk-blockchain-key-challenges.pdf.