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Table of Content

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Climate-Related Disclosure in Malaysian *Wakalah Sukuk*

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Abstract

It is evident that climate change, especially those related to Covid-19 has opened many new avenues of research and policy making initiatives. Climate-related disclosure is among them. While a number of policies have been drafted and finalized in both local and international markets, the practices to conform to the policies are only at the infant phase. Considering the initiatives taken by global policy makers and local regulators in relation to climate change, it is imperative to provide some insights on the responses of various financial players. For a beginning, this study has considered a number of *sukuk* issuers and their climate-related disclosures. Since these issuers' principal activities involve various business activities, diversity of climate change and climate-related disclosures are anticipated. Using a document analysis on 13 selected *Wakalah sukuk* documents, it was found that there are four types of climate-related risk disclosure with six types of disclosure practices. Further analysis is based on the provisions of Climate Change and Principle based Taxonomy (CCPT) (2021) and recommendations of Task Force Climate related Financial Disclosure (TCFD), the climate-related disclosure was found to be minimal and inadequate. However, the findings of this study are only limited to small sample size. Nonetheless, the findings may provide some insights for the financial players in their efforts to provide a quality climate-related disclosure and practices in tandem with the initiatives of the local regulators and international policy makers.

Keywords: *legal risk management, wakalah sukuk, Covid-19, climate change*

1. Introduction

> "The effects of climate change are not merely an ecological problem for scientists and conservationists to worry about. It presents a major economic issue with direct implications on financial stability. It is for this reason that Bank Negara Malaysia, along with many other central banks around the globe, are giving serious attention to climate risk" (Governor Nor Shamsiah,)

In her keynote speech for Regional Conference on Climate Change in September 2019, the Governor of Bank Negara Malaysia (BNM) has raised her concerns towards climate change and its effects. Climate change or climate risk is a multi-facets issue, i.e., not limited to the environment and science but economics, politics and diplomacy as well (Zhou & Mori, 2008). Similarly, climate change was also proven to be detrimental towards the financial markets. It was reported by Bank Negara Malaysia (BNM) (2021a) that as in November 2019, 11.7% assets held by Malaysian financial players were exposed to the effects of climate change. As a consequence, BNM has urgently directed all financial institutions to refer to the first batch climate change-related framework issued with reference to specific sectors, i.e., palm oil, renewable energy and energy efficiency in April 2021 to set the first response to climate change for financial markets. This initiative, i.e., the issuance of Climate Change and Principle-based Taxonomy (CCPT), is also in tandem with other global initiatives to address climate change as risk to financial markets, e.g., the Paris Agreement 2015, the European Commission climate actions and the application of Task Force for Climate-related Financial Disclosures

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(TCFD).

A study conducted by Beyer *et al.* (2021) has found that there is a significant relationship between the local bat species richness and the SAR COV-1 and SAR COV-2 infections in the hotspot areas, i.e., southern Chinese Yunnan province. It was also discovered that the local bat species' geographical distribution was driven by the climatic changes in the province. Thus, it was implied that climate change may have played key role in the evolution of the two SARs as well as their transmission (Beyer *et al.*, 2021; Moore, 2021). For the past two years, the impacts of Covid-19 pandemic have been severe for most sectors, particularly manufacturing, real estate and business, wholesale and retail trade, accommodation and food (Lim, 2020). For the financial sector, it was proven that the Covid-19 pandemic have exposed the banks to more financial losses, i.e., in their stock returns and reduction of annual returns (Demirgüç-Kunt *et al.*, 2021). Similarly when the banks were urged to provide financial assistance, e.g., repayment flexibility and moratorium, they may also be exposed to reduction in loan/financing growth, liquidity as well as earnings (Jing, 2020), not to mention a few challenges in their operations due to the Movement Control Order (MCO) (Lim, 2021).

Climate change *per se* has long been acknowledged as a significant risk, particularly greenhouse-induced climate change (Jones, 2003). Among the earliest formal unit established to address climate change was Intergovernmental Panel on Climate Change (IPCC), i.e., in the year 1988. Its function has been described as to provide comprehensive review and recommendations in relation to the state of knowledge of climate change, the impacts of climate change and the potential response strategies (IPCC, 2021; Park, 2015). In 1992, a United Nation Framework Convention on Climate Change (UNFCCC) was held to address the issue of climate change and the adverse effects of climate change. In the Convention, climate change was defined as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods". On the other hand, the adverse effects of climate change was described as changes in the environment, as in physical environment or biota that affect the ecosystems as well as on the operation of socio-economic systems and the health and welfare of human beings. In the long run, the adverse effects of climate change have dispersed to other aspects of life, i.e., education, tourism, insurance industries as well as banking industries.

Chenet (2019) reported that, prior to the emerging trends of studies on climate change associated with finance, the former was perceived as a risk borne by the policy makers. In early 2000s, climate change in project finance was reported as risks that the project have towards the climate/ environment instead of the vice versa (Chenet, 2019). As the Covid-19 pervasiveness worsened, climate change was overwhelmingly perceived as a source of risk in finance (Liu *et al.*, 2021; Paisley and Nelson, 2019; Rudebusch, 2021). Based on Rudebusch (2021), climate changes pose physical risks and transition risks towards the financial institutions. Considering these significant findings, it is inadequately known on how and to what extent the financial sectors have incorporated climate change into their risk management policies as well as the approach, strategies and tools made available by for the risks.

As found in Abhayawansa and Adams (2021), reporting of climate change as risk within the selected industries was found to be inadequate. Similarly, studies conducted by others also found that the reporting of climate change was still minimal (Lombardi *et al.*, 2021; Thaker, 2020). Even though findings of these studies provide beneficial insights of the current practice of climate-related disclosure and reporting, more data are needed to determine on what and how the climate change has been disclosed by the financial players, considering the potential and evident effects of the former towards the latter. In conjunction with the continuous urges by the Bank Negara on the application of Task Force on Climate-Related Financial Disclosure (TCRF) (BNM, 2021c), reference should also be made to TCRF in order to ensure compliance of the climate-related disclosure with the global standards and the local regulatory standards.

'Sak', or well-known by its plural '*sukuk',* is a financial instrument that enables the Issuer to raise fund to finance its project through securitization. Considering the active roles of *sukuk* within the Islamic capital market and Islamic finance, particularly on the aspect of active participation of diverse backgrounds of Issuers and investors may entail the issue of risk management, e.g., how Issuer of different sectors discloses the risks to the investors and how investors of diverse jurisdictions may be affected by the risks embedded in the *sukuk.*

Risk reporting by the Issuer may be made available through the Issuer's annual report. However, risk reporting within specific project securitization is made through risk disclosure in the bonds or *sukuk* documentation (IFSB, 2013). This risk disclosure has been perceived by some as a technique of risk management (Barnes and Bagley, 1994; Sandler, 2010). In the Malaysian context, a *sukuk* prospectus as part of *sukuk* documentation is governed by the Prospectus Guidelines (SC-GL/PG-2012 (R3-2017). According to the guidelines, the provision on risk must "disclose the risk factors that would have a material adverse effect on the corporation's business operations, financial position and results, and shareholders' investments in the corporation" (p.10). Nonetheless, which risk factors relating to climate change to be disclosed may still be subject to the Issuer's decision since the provision literally provides ample room for discretion.

Since climate-related disclosure is still a new avenue for financial sectors in Malaysia, the findings of this study are expected to advance some information as well as to recommend further improvements in tandem with the efforts of Securities Commission and BNM (SC & BNM, 2021) towards the nascent climate-related assessment and disclosure requirement as seen in Climate Change and Principle-based Taxonomy (CCPT)(BNM, 2021b) and TCFD, i.e., particularly on the climate-related disclosure of physical risk, transition risk and liability risk. Thus, the objectives of this study are to: 1) identify the climate-related disclosure within *sukuk* documents, 2) analyse the climate-related disclosure practices within the *sukuk* documents, and 3) analyse the climate-related disclosure practices from the perspectives of recommendations provided in the TCFD and CCPT for financial players.

2. Literature Review

2.1 Climate change in various fields

Considering the many facets of climate change effects, past literature has shown diverse research concerns on the issue. They are either on the effects of climate change towards the agriculture sector (Addis and Abirdew, 2020; Gomez, 2015), social and political science (Nursey-Bray, 2010), business (Haigh and Shapiro, 2012; Lombardi *et al.*, 2021; Mair, 2011; Pineda, 2016; Thaker, 2020), economics and finance (Abhayawansa and Adams, 2021; Liu *et al.*, 2021; Park, 2015); climate change reporting and the research trends on climate change (Hartman, 2016; O'Dwyer and Unerman, 2020).

The literature on climate change can be traced back as early as 1980s, particularly on the exploration of the effects of climate change from scientific perspectives (Le Treut *et al.*, 2005). However, concerns pertaining to climate change have changed tremendously over the years. One of the concerns was on the effects of climate change on the agricultural sector. A study was conducted empirically on climate change strategies adopted on selected corps (Gomez, 2015). It was also found that few determinants influenced the decisions of climate change adaptations, i.e., information about future climate change conditions, social capital and access to formal extension and farmer-to-farmer extension. Similarly, it was discovered that climate change adaptation strategies of smallholder farmers in central Ethiopia were improving their crop varieties and input intensity, employing crop diversification, adjustments in their operation, i.e., time to plant, as well as soil and water conservation (Addis and Abirdew, 2020). Among the adaptation determinants identified by farmers include experience and historical data from the past farming (Addis and Abirdew, 2020).

In the field of social and political sciences, climate change has been studied in the aspect of climate change adaptations, i.e., developing module for climate change education for university course and training for maritime space. In a similar vein, adaptation strategies by Canadian archives were also explored (Oliver, 2021). The study conducted interviews on how the relevant parties perceived climate change adaptations for the Canadian archives. The climate change-related studies in the field of business took a different approach. The studies were either on the effects of climate change on a business or on the climate change strategies that have been developed by the businesses. In a study, the effect of climate change on event industry was explored (Mair, 2011). This conceptual study discussed the vulnerability, the adaptation and adaptive capacity of event industries towards climate change (Mair, 2011). Another study posited that a business may be affected by climate change through physical risk/resource risk and policy risk, i.e. the risks arising from government actions that can complicate the global supply chain (Pineda, 2016). These two risks were conceptualized within the supply and demand domains of a business. A case study was also conducted on automotive retailing sector and food retailing sector. The study found that climate change should be described under the supply, operation and demand domains of the company and suggested few climate change mitigation strategies. On the climate change strategies, there are two types of research evident in the literature. One that investigated the reporting of climate change and another that investigated on the measurement used to report the climate change. For the former, it was found by few studies that the climate change reporting particularly on financial risks that may arise from climate change in selected business is still lacking (Abhayawansa and Adams, 2021; Lombardi *et al.*, 2021).

Similarly, in another study, the reporting was found to be minimal (Thaker, 2020). For the latter, it was noted by the researcher that while significant number of studies have been conducted on climate change reporting, only a few have dived into how the reporting was derived from the climate change data. In his study, he investigated the measurement used to report the carbon emissions and how they have been reported. Selected diverse companies reporting (Carbon Disclosure Project) have been employed. The measurement and reporting were found tenuous (Haigh and Shapiro, 2012).

2.2 Climate change in economic and financial fields

For the economic and financial fields, a few studies can be found. A theoretical study done by Park (2015) has discovered that some theories have been proposed on the positive roles capitalism might play in securing climate change. However, the study posited that capitalism itself will endanger the environment unless efforts towards environment friendly wealth creation are in place. In view of this, there are some hypothetical effects of climate change on economics explained by this study, i.e., effects of capitalism towards the environment and the positive effects of climate change towards capitalism due to the formation of alternatives as results of natural resources depletion.

Similarly, insurance businesses were also proven to be affected by climate change. Hence, few studies were found on the climate change strategies and mitigation by the insurers. Considering the fact that insurers play ubiquitous roles in adapting to climate change of the insured, some strategies were recommended; reinsurance, hedging, risk spreading (Dlugolecki, 2008; Doherty, 1997; Fankhauser, 2012), not to mention other external strategies, e.g., improve building resilience, abiding to planning regulations and building codes to adapt to flood risk (Abbott, 2014). Another study found on this was empirical, i.e., on the effects of climate change on financial stability. Even though it has been long speculated on the effects of climate change on finance (Fankhauser, 2012), only a few has been maneuvered to investigate this empirically. In a study, evidences were found to support that climate change have effects on financial stability. This study developed financial stability index and found that there was non-linear and asymmetric relationship climate change and financial stability (Liu *et al.*, 2021).

2.3 Risk Reporting

One of the recent studies related to risk reporting was on its conceptual framework, i.e., risk reporting that includes Covid-19 risks and uncertainties (Crovini *et al.*, 2021). The framework incorporated disclosure and strategies as well as how the information can successfully reach relevant stakeholders (Crovini *et al.*, 2021). A study by Mcchlery and Hussainey (2021) found that risk reporting was not driven by the mandatory requirement. Other considerations, i.e., degree of risk, quality of firm, level of stock exchange and organizational visibility are among those that have impacted the risk reporting. Back in 2007, similar behavior of reporting was found, i.e., not driven by mandatory requirements (Mokhtar and Mellett, 2013). However, it was found by Mokhtar and Mellett (2013) that there was a tendency to report more backward-looking and qualitative risk disclosure in comparison to forward-looking and quantitative risk disclosure. The considerations that impacted the risk reporting were competition, role duality, board size, ownership concentration and auditor type (Mokhtar and Mellett, 2013).

Risk reporting was also attached to corporate disclosure. It was reported that financial risk disclosure and corporate disclosure are among understudied area of interest (Khandelwal *et al.*, 2019). In their study, i.e., systematic literature analysis, they indicated that most of the researchers have focused on the limited or single period to examine the risk disclosure practices, determinants and corporate performance. Hence, inadequate. In fact, based on our initial document analysis, it was also evident that risk reporting in *sukuk* documents, or *sukuk* issuer's disclosure is also lacking even though *sukuk* portfolios involved variety of risks, including climate change.

2.4 Climate change reporting

Literature on climate change reporting is nascent. Nonetheless, a few climate-changes reporting research can be found on business entities in several jurisdictions. For instance, a conceptual framework was proposed to conceptualize climate change reporting from the supply, operation and demand domains of a company (Pineda, 2016). This study posited that a business may be affected by climate change through physical risk/resource risk and policy risk, i.e., the risks arising from government actions that can complicate the global supply chain. These two risks were conceptualized within the supply and demand domains of a business. A case study was conducted on automotive retailing sector and food retailing sector. The study found that climate change should be described under the supply, operation and demand domains of the company and suggested few climate change mitigation strategies (Pineda, 2016).

In addition to this study, several studies that employed empirical data on climate change reporting were also found. Using four keywords count and quantitative content analysis on 90 Australian, New Zealand and Global 500 group, a study found that reporting of climate change is still minimal, most disclosure were on the societal effects of climate change and how the corporations have responded towards it. Also, a shift in reporting global warming into climate change was also evident (Thaker, 2020). Another study employed data from selected large entities, i.e., airlines, cruise and hotel (Abhayawansa and Adams, 2021). This study found that reporting of climate change was made in reference to legal risk, instead of physical and transition risks. The reporting was found to be inadequate because, there is (1) lack of recognition of the long-term nature of climate-related risks and the likelihood of pandemics; (2) lack of detail on the business impacts of risks; (3) lack of disclosure of risk mitigation strategies for pandemic-related risks and climate-related physical risks; and (4) subpar reporting of linkages between pandemic- and climate-related risks, governance, strategy and risk management. However, the reports assessed in this study were those issued prior to 2019 Covid-19 epidemic and pandemic to really address the recent climate change reporting of the companies. In similar vein, a study was also conducted to investigate climate-related information reported by the public interest entities (PIE), i.e., using the reporting of 34 large IPE in EU (Lombardi *et al.*, 2021). It was found that the reporting on financial risks arising from climate change by the entities is inadequate. However, the study also noted that the inadequacy has signaled the early phase of compliance by PIEs in regards to the climate-related disclosure based on the European Commission guidelines.

It is noteworthy that studies on climate change reporting and climate-related disclosure are emerging and confined to business entities. The findings of some have shed some lights on the risk reporting and climate-related disclosure of the business entities, mostly large entities studies (Abhayawansa and Adams, 2021; Lombardi *et al.*, 2021; Thaker, 2020). Given the large samples used in the previous studies and the quantitative approaches, this study has opted for small sample and qualitative approach to analyze thoroughly the practices of climate-related disclosure. Considering the diversified sectors/backgrounds of *sukuk* Issuers, hence diverse inherent risks in *sukuk*, the findings of this study may be useful to fill in the gap in the existing literature on climate-related disclosures.

3. Conceptual Framework

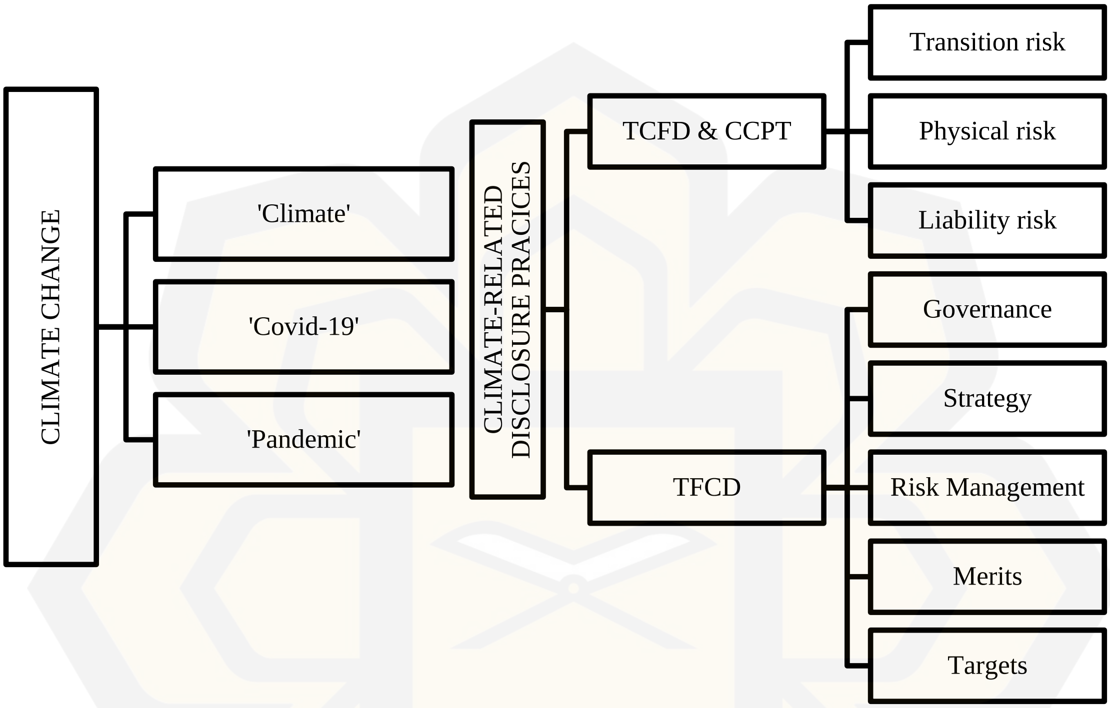
Climate change has been defined in slightly different ways. In a study, it was observed that there are two sets of definition provided by relevant policy maker (Pielke, 2005). According to IPCC, the United Nations group which was tasked to assess climate science for the effect of policy making, climate change is "any change in climate over time whether due to natural variability or as a result of human activity". Based on the Framework Convention on Climate Change (FCCC), climate change is "'a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability over comparable time periods". At the same time, there is also more scientific definition of 'climate change' analyzed by Werndl (2016) that was offered as "climate as the finite distribution of the climate variables over time relative to a regime of varying external conditions".

These definitions, if taken literally are different in terms of the causes of the climate change, i.e., (1) natural variability and human activity as seen in IPCC definition, (2) direct and indirect human activity as seen in FCCC definition and (3) non-specified external conditions (Werndl, 2016). Thus, this study will take all the causes availably disclosed. On the other hand, definition of climate related disclosure has not been adequately addressed in the relevant policies, CCPT and TFCD. However, it was found in the draft of IFRS Sustainability Disclosure Standards that 'climate-related disclosure' by an entity has the objectives to disclose information that can enable users of its general-purpose financial reporting to determine the effects of climate-related risks and opportunities, understand the available resources to manage the risks and evaluate the entity's ability in response to climate-related risks and opportunities. Based on these, climate-related disclosure can be any information that can achieve the objectives.

In the Malaysian context, there is also no specific guidelines on how the climate-related risks should be disclosed. However, the current recommendations by Bank Negara on the application of Task Force on

Climate-Related Financial Disclosure (TCRF) (BNM, 2021c) and Climate Change and Principle-based Taxonomy (CCPT) (BNM, 2021b) i.e., particularly on the climate-related disclosure of physical risk, transition risk and liability risk can be referred to. These are to analyze the climate-related disclosure practices in tandem with international standards, TCRF and local regulatory standards, CCPT.

Figure 1: Conceptual Framework



4. Research Methodology

This is an exploratory study, i.e., to determine the climate change disclosure in Malaysian *sukuk* documents. It employs inductive approach, using a content analysis technique. Content analysis is used as both data collection and data analysis instruments. The *sukuk* were selected from the list of *sukuk* registered under the LOLA e-submission system of SC Malaysia. Since this study focuses on the climate change disclosure with emphasis on the pandemic Covid-19, only *sukuk* issued in the year of 2019, 2020 and 2021 were shortlisted.

Table 1: List of *sukuk* issued in 2019-2021.

No.	Year	***Sukuk* Issuance (by type)**	**No. of *sukuk* issued**
1.	2019	*Wakalah*	1
		Murabahah	6
		Musyarakah	2
		ASEAN/SRI	2
		Perpetual	1
			(12)
2.	2020	*Wakalah*	12
		Murabahah	7
		Musyarakah	2
		Ijarah	1
		ASEAN/SRI	2

		Perpetual	1
			(25)
3.	2021	*Wakalah*	8
		Murabahah	3
		Musyarakah	3
		Ijarah	1
		ASEAN/SRI	3
			(18 as at Jan 2022)

Based on Table 1, *sukuk* based on *wakalah* is the most employed structure. This structure is preferred among the *sukuk* issuers because it offers returns that mimic the return of a conventional bonds (ISRA Islamic Commercial Law Report, 2017). It was reported that the outlook for this structure is convincing with the attitude of Islamic financial institutions issuing *wakalah sukuk* to conform with the Basel III requirements (Thomson Reuters, 2016). This is because, under the *wakalah sukuk* structure, the underlying asset can be a pool of assets. The pool may consist of a mixture of tangible asset and intangible asset, shares and receivables. Islamic financial institutions normally hold a huge number of receivables, like commodity murabahah receivables (ISRA, 2017). This kind of underlying asset allows the financial institutions to convert the *sukuk* into shares of common equity. As a result, this study will select this structure and employ only those *wakalah sukuk* that have been issued (exclude pending issuance) to identify the climate-related disclosure. From 2019-2021, it was found that there were 24 *sukuk* issuance based on *wakalah* contract. However, only 21 *wakalah sukuk* has been successfully issued at the time of the data collection. Out of the 21 *wakalah sukuk* that have been issued, only 13 *wakalah sukuk* complete documents can be retrieved from the website, i.e., Securities Commission (SC) and Bixmalaysia, an associated link to facility information. Therefore, the final dataset consists of only 13 *wakalah sukuk* as follow:

Table 2: Coding of *Wakalah Sukuk* Employed in the Dataset.

Code	Issuer	Issuer Background	IM (A)	TD (B)	Year Issued
1.	MBSB Bank Berhad (Senior *Sukuk Wakalah* and/or Tier-2 *Sukuk Wakalah* and/or Additional Tier-1 Capital *Sukuk Wakalah* Programm)	Financial Institution	√	√	2019
2.	SHC Capital Sdn. Bhd. (*Sukuk Wakalah* Programme)	SPV (Investment Holding), subsidiary of TCE that involves in supply of materials/ equipment to water, oil and gas industries	√	√	2020
3.	BGRB Venture Sdn Bhd (*Sukuk Wakalah* Programme)	SPV (Investment Holding), Guarantor involves in investment holding and provision of management services in property investment and development etc.	√	√	2020
4.	Perbadanan Kemajuan Pertanian Negeri Pahang (*Sukuk Wakalah* Programme)	Statutory Body involves in agriculture (mainly palm oil plantation)	√	√	2020
5.	Bank Pembangunan Malaysia Berhad (*Sukuk Wakalah* Programme)	Development financial institution	√	√	2020

6.	Guan Chong Berhad (*Sukuk Wakalah* Programme)	Public Limited Company, managing subsidiaries involved in manufacturing cocoa products	√	√	2020
7.	Sunsuria Berhad (*Sukuk Wakalah* Programme)	Private Limited Company, involves in investment holding and provision of management services in property investment and development etc.	√	√	2020
8.	Evyap Sabun Malaysia Sdn. Bhd. (*Sukuk Wakalah* Programme)	Private Limited Company, owed by 2 foreign companies. Principal activities are manufacturing and sale of all kinds of soaps, oleochemical and personal care products.	√	√	2020
9.	Bermaz Auto Berhad (IMTN/ICP *Sukuk Wakalah* Programme	Public Company (Investment Holding). Principal activities are distribution, retailing of Mazda vehicles and provision of after-sales services for Mazda vehicles in Malaysia.	√	√	2020
10.	Leader Energy Sdn Bhd (ASEAN Green SRI *Sukuk Wakalah*)	Private Limited Company. Owns 2 companies to operate the project. The project companies principal activities are: *LSE 1*: engineering, procurement, construction, operating and maintenance of solar photovoltaic power plants. *LSE 2*: the operation of generation facilities that produce electric energy.	√	√	2020
11.	Dialog Group Berhad (Senior and/or Subordinated Perpetual *Sukuk Wakalah* Programme)	Private Limited Company. Own subsidiaries which involve in mainly the oil, gas and petrochemical industry.	√	√	2021
12.	Putrajaya Holdings Sdn. Bhd. (*Sukuk Wakalah* Programme)	Private Limited Company. Principal activities are property development, leasing of buildings and investment holding.	√	X	2021
13.	Eco World Capital Services Berhad (Islamic Medium Term Notes)	Public Limited Company. Issuer is a wholly owned subsidiary of Kafalah Provider, i.e. Investment holding company with subsidiaries principally involved in property development, investment holding, property investment holding etc.	√	√	2021

This study employs document analysis, through keyword search and themes developed from the data itself. The keywords search will involve a few terms, i.e., “climate”, “Covid-19”, “pandemic”, “environment”. The keyword search will be made on the “Investment Considerations” (IC), an important part within the *sukuk* Information Memorandum (IM) where *sukuk* Issuer issues all the risks associated with the *sukuk*. To supplement the IM, the keyword search will also be made on Trust Deeds (TD) of the selected *wakalah sukuk*. Given the fact that TD is a contract between the Issuer and the Trustee who represents the *sukuk* holder, it is plausible to anticipate certain risk management techniques, where the risk is disclosed. The keyword search will lead into the climate-related disclosure practices, e.g., disclosure of risk, risk mitigation strategies etc. If possible, the disclosure practices will be categorized into the disclosure of transition risks and physical risks, following the dominants of TCFD, as well as liability risk, additional dominant following the CCPT. From there, the climate change risk disclosure in the perspectives of Malaysian *sukuk* may be conceptualized, hence, identified potential use for the financial players.

5. Finding and Discussion

Table 3: Frequencies of Climate-related Disclosures in the Selected *Wakalah Sukuk*

	1.A.	2.A.	3.A.	4.A.	5.A.	6.A.	7.A.	8.A.	9.A.	10.A	11.A	12.A	13.A	To tal
CR1 Gr*= 9	0	1	2	0	0	0	2	0	0	2	0	1	1	9
RR8 Gr*= 23	0	1	4	0	1	4	2	0	2	0	4	2	3	23
RR7 Gr*= 7	0	1	1	2	0	0	0	1	0	1	0	0	1	7
RR9 Gr*= 12	0	0	1	0	1	3	1	1	2	1	1	0	1	12
Totals	0	3	8	2	2	7	5	2	4	4	5	3	6	51

*Note: * Gr is the grounded count, i.e. the counts of the code throughout the documents.*

As indicated in Table 3 above, changes in domestic regulatory conditions risks are the most disclosed climate-change in the *wakalah sukuk* IM. The least disclosed climate change is the changes in international regulatory conditions risks at the count of 7 only. While most documents have disclosed on climate change, similar finding cannot be implied on 1.A. It is assumed that the disclosure was not evident due to unforeseen significant effects of climate change at the time when the IM was issued. This is because, the IM was issued on 22nd November 2019, when the peak on Covid-19 expansion was yet to reach Malaysia.

Based on our document analysis, it was found that there were two types of climate-related disclosures found in the *wakalah sukuk* IM. In these disclosures, the Issuer disclose the risks as follow:

1) *Climate-related compliance risk disclosure:*

a. (CR1) Compliance to Environmental Laws Risk: risks associated with compliance to various environmental laws. The Issuer is subject to various environmental laws, policies and regulations. Non-compliance with the laws may lead to few implications e.g., suspension or revocation of Issuer' license to operate, financial and criminal liabilities. This risk arises when the Issuer/Guarantor as the case may be, gave no assurance that compliance to the laws can be made.

2) *Climate-related regulatory risk:*

a. (RR7) Environmental Law Risk: Risks associated with changes in health, safety and environmental laws. For some Issuers, these risks cover many aspects e.g., laws pertaining to water, air, noise pollution and the disposal of waste materials etc. Changes in environmental laws or standards imposed by the relevant regulatory body may lead to changes in costs or revenue of the Issuer. This is particularly apparent when the laws or standards became more stringent in the future.

b. (RR8) Changes in Domestic Regulatory Conditions Risks: Changes in regulatory conditions, domestically that may have adverse impact on the *wakalah sukuk*. This type of risk is frequently reported in the IC as "Political, Economic and Regulatory Considerations". This risk also includes changes or in some IM, "adverse developments" in the government current regulations and policies, e.g. Movement Control

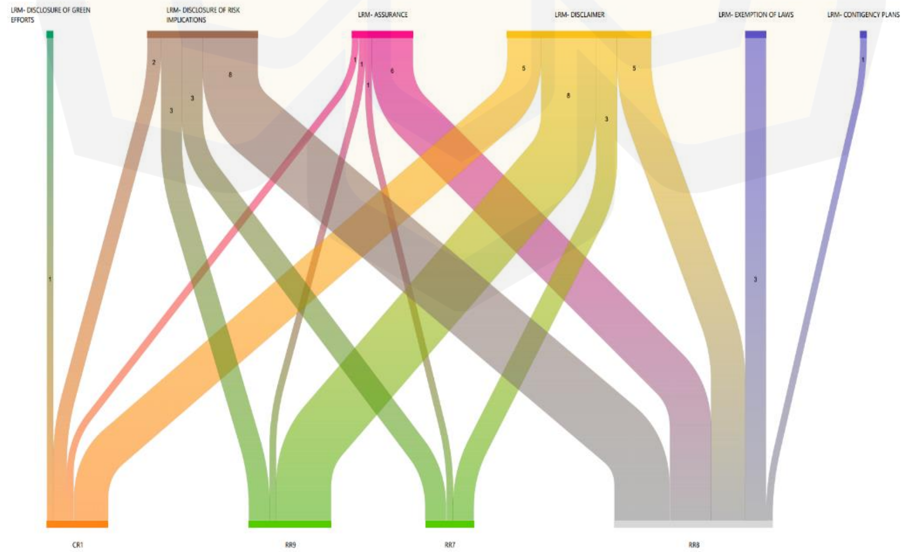
Orders; in curbing the Covid-19 spread for *sukuk* issued from 2019 onwards and the uncertainties of the changes.

c. (RR9) Changes in International Regulatory Conditions Risks: Changes in regulatory conditions internationally that may have adverse impact on the *wakalah sukuk*. For Issuers that hold businesses or investments outside of Malaysia, this risk is associated with laws, regulations, e.g., taxation laws of that foreign countries. This risk also includes changes in the foreign government current regulations and policies in curbing the Covid-19 spread for *sukuk* issued from 2019 onwards and the uncertainties of the changes. This type of risk is reported in the IC as "Political, Economic and Regulatory Considerations" with the inclusion of "other regions", "Malaysia and other countries in the region" or ", changes in political, economic, business and regulatory conditions domestically and internationally".

Table 4: Code-Code Occurrence Analysis of the Climate-related Disclosure Practices in the Selected *Wakalah Sukuk.*

	● CR1 Gr=9	○ RR8 Gr=23	● RR7 Gr=7	● RR9 Gr=12	Total
● DISCLOSURE 1_ASSURANCE Gr=9	1	6	1	1	9
● DISCLOSURE 2_CONTIGENCY PLANS Gr=1	0	1	0	0	1
● DISCLOSURE 3_DISCLAIMER Gr=21	5	5	3	8	21
● DISCLOSURE 4_DISCLOSURE OF GREEN EFFORTS Gr=1	1	0	0	0	1
● DISCLOSURE 5_DISCLOSURE OF RISK IMPLICATIONS Gr=16	2	8	3	3	16
● DISCLOSURE 6_EXEMPTION OF LAWS Gr=3	0	3	0	0	3
Totals	9	23	7	12	51

Figure 2: Sankey Diagram of Code-Code Occurrence Analysis, i.e. Climate-related Disclosure and Climate-related Disclosure Practices.



In addition to the disclosures of the risk, it was found that each of the disclosures is associated with certain strategies and risk management techniques. Table 4 and Figure 1 above indicate that there are six climate-related disclosure practices used in the *wakalah sukuk* documents. Details are as below:

a. *(CR1) Compliance to Environmental Laws Risk:*

i. CR1 ASSURANCE: This risk is associated with an assurance given by the Issuer towards its compliance with the environmental laws risk. This technique is employed in 3 out of 10 Issuers which disclosed this risk.

ii. CR1 DISCLAIMER: This risk is associated with a disclaimer. In regards to this, the Issuer gives no assurance that the existing strategies and precautions taken can successfully mitigate the risk. 5 out of 10 Issuers employed this technique.

iii. CR1 DISCLOSURE OF RISK IMPLICATIONS: This risk is associated with a disclosure of the risk implications. Instead of using an assurance and a disclaimer, the Issuer highlights the adverse impacts of the risk to raise the attention of the potential investors.

iv. CR1 DISCLOSURE OF GREEN EFFORTS: As seen in 7.A., the Issuer employs a disclaimer to avoid the liabilities arising from non-compliance to the environmental laws. However, the disclaimer is accompanied with 'green efforts assurance', i.e., "Third-party consultants and accredited laboratories are engaged to test environmental samples to ensure the prescribed limits enforced by the Department of Environment are met'.

b. *(RR7) Environmental Law Risk:*

i. RR7 ASSURANCE: The risk is associated with an assurance. In this view, the Issuer assures that necessary actions have been taken, or the Issuer gives indirect assurance, e.g., Issuer states that no current or existing violations of the laws that can create environmental law risk.

ii. RR7 DISCLAIMER: The risk is associated with a disclaimer. In this view, the Issuer disclaim the liabilities that may arise from the environmental laws, future laws or regulations and different interpretations of the existing environmental laws or regulations that may impose additional material environmental liabilities towards the Issuer. The disclaimer may also include disclaimer over third party liability, e.g. contractor, as indicated in 12.A.

iii. RR7 DISCLOSURE OF RISK IMPLICATIONS: Some Issuers do not employ assurance and disclaimer but they disclosed the risk implications, e.g., the risks may result in the claim for of damages, imposition of fines, criminal sanctions or the suspension or cessation of the facilities and operations of the Issuer. However, it was also found that only in 12.A. that assurance and disclosure of risk implications have been employed concurrently.

c. *(RR8 & RR9) Changes in Domestic and International Regulatory Conditions Risks:*

i. RR8 EXEMPTION OF LAWS: RR8 include risks arising from the changes in regulation due to the Government control over the Covid-19 spread. Therefore, some Issuers have disclosed the legal exemption that they enjoyed during the Covid-19 Movement Control Order's period to instill confidence in the potential investors towards the business and operation of the Issuer. Thus, legal exemption, particularly due to 'essential service' status, maybe perceived as LRM technique as well.

ii. RR8 CONTIGENCY PLANS: As found in 12.A., the disclosure of the risk is associated with certain contingency plans. It was stated by the issuer that due to the risks a comprehensive business continuity plan has been prepared to identify various mitigation measures to moderate the impact of COVID-19. Some of the measures indicated in the document were providing rebate to the purchase price of its residential properties, providing rebate in respect of rental payment of its retail lots and commercial buildings as well as exercising a more prudent management of its cash flows from operating, investing and financing activities. These plans are to ensure operational continuity were specifically disclosed in relation to the regulatory condition changes due to Covid-19.

iii. RR8 and RR9 ASSURANCE: The disclosure of these risks is associated with an assurance. In this regard, the Issuer used assurance statement towards the risk, e.g., the Issuer gives assurance the overall outlook for its business and operation is promising despite the changes in the regulatory conditions.

iv. RR8 and RR9 DISCLAIMER: These risks are disclosed and at the same time, disclaimed by the Issuer. This disclaimer is frequently employed in a way that the Issuer gives no assurance that the changes or adverse developments in the domestic and international regulatory conditions will not have adverse effects towards the Issuer business, financial position and operation. Some Issuers also give assurance that necessary precautions have been taken, particularly in relations to the changes in the regulatory conditions due to Covid-19, nonetheless the adequacy and effectiveness of the precautions are disclaimed by the Issuer.

v. RR8 & RR9 DISCLOSURE OF RISK IMPLICATIONS: Under some *wakalah sukuk*, these risks are disclosed without disclaimers. Nonetheless, the Issuer has disclosed the implications of the risks towards the Issuer business, financial position and operation.

6. Conclusion and Recommendation

TCFD is a global industry-led task force under the Financial Stability Board that was established to develop voluntary consistent disclosures of financial risks related to climate change. In 2017, the task force has made its final recommendations on climate-related disclosures. In TCFD (2017), four widely adoptable recommendations were highlighted by the task-force on climate-related financial disclosures that should be applicable to organizations across sectors and jurisdictions particularly to financial-sector organizations, that may include banks, insurance companies, asset managers as well as asset owners. These voluntary consistent disclosures are recommended so that it will benefit many stakeholders, e.g., investors, lenders etc. The recommendations by the TCFD are:

1) Disclosure of climate change in the organizations' mainstream financial filings;
2) Disclosure of climate change under four themes: 1) governance, 2) strategy, 3) risk management and 4) metrics and targets[1].
3) Disclosure of climate change scenarios.

On the other hand, CCPT is among the earliest response of the Malaysian regulator towards climate change, besides the Value-based Intermediation Financing and Investment Impact Assessment (BNM, 2018) and Joint Committee on Climate Change (JC3). As outlined in para 1.7. of CCPT, the purpose of the guidelines is to provide a principle-based taxonomy for financial players on how to assess and categorize their economic activities based on the extent to which those activities meet the climate objectives, particularly in promoting low carbon economy. Simultaneously, the principle-based taxonomy is also perceived to be the initial platform to develop standardized classification and reporting of climate-related exposures to support financial players' risk assessments (BNM, 2021b).

As indicated in CCPT and TCFD, there are three types of climate change, i.e., the physical risk, transition risk and liability risk. Physical risk is defined as a risk that arises from climate-related events that are acute and causes long term shift. In TCFD, this risk is categorized into two: 1) Acute risk (e.g. frequent natural disasters like hurricane and cyclones), and 2) Chronic risk (e.g. prolonged higher temperature) (TCFD, 2017). These risks are considered financial risks because they may cause damage in property, reduce productivity and disrupt trade (BNM, 2021b). Transition risk is a risk that resulted from adjustment to a low-carbon economy. The adjustment to be made may be due to changes in public policy and strategy, legislative and regulatory frameworks, technological advancements as well as changes relevant stakeholders' behaviour (BNM, 2021b). Liability risk is a risk arising from the legal implications, i.e., claims on damages and losses incurred from "inaction or lack of action that results in the effects of physical and transition risks" and it is called as 'climate-related liability' (BNM, 2021b). As found in TCFD (2017), the liability risk was embedded within the transition risk. The transition risk was categorized into four: 1) Policy and legal risks, 2) technology risk, 3) market risk and 4) reputational risk.

Our analysis was initially made on all keywords search using appropriate terms in both the IM and TD. The result of the keyword search has yielded two types of climate change, or climate-related disclosures on the risk, i.e., compliance risk and regulatory risks: 1) environmental law risk and 2) changes in local regulatory conditions risks and 3) changes in international regulatory conditions risks, mainly from the IM. Climate-

[1] In the TCFD, the themes are described as follow: "1) Governance: The organization's governance around climate-related risks and opportunities; 2) Strategy: The actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning; 3) Risk Management: The processes used by the organization to identify, assess, and manage climate-related risks; 3) Metrics and Targets: The metrics and targets used to assess and manage relevant climate-related risks and opportunities".

related disclosure was not found in TD as initially anticipated. Based on these disclosures, it can be concluded that the disclosed risks only fall into two types of climate change, i.e., transition risk and liability risk. Considering various backgrounds of Issuer involved in the dataset, including those directly involved in agriculture, power plants as well as those indirectly involved in water, oil and gas industry, there is still inadequate disclosure available on physical risk even though the risks should be inherent within certain Issuer businesses, e.g., agriculture, power plants, water, oil and gas industries.

In addition to the climate-related disclosure practices as depicted in Table 4 and Figure 1, the six types of disclosure practices may be regarded as minimally in line with the TFCD recommendations on the four themes disclosures: 1) Governance, 2) Strategy, 3) Risk Management and 4) Merits and Targets. Under the first theme, the financial players are recommended to disclose the governance developed to address the climate-related risks. Based on the analysis or the six types of disclosures, there is insufficient evidence to indicate that disclosure under the first theme was made.

Under the second theme, the financial players are recommended to disclose the actual and potential impacts of the climate change as well as opportunities for the financial players towards their business, strategy and financial planning. Based on the analysis, it can be noted that some strategies were evident through:

1) Disclosure 2 - Contigency Plans, where certain contingency plans were highlighted to overcome the potential impacts of climate change.
2) Disclosure 5 - Disclosure of Risk Implications, where the actual and potential impacts of the climate change were disclosed,
3) Disclosure 6 - Exemption of laws; where the Issuers disclosed the opportunities that they gained through the exemption of laws, i.e., exemption given by the government for the Issuers to operate amidst the Movement Control Order (MCO) mainly due to the nature of the Issuer's business as essential services.

Under the third theme, the financial players are recommended to disclose the processes employed by the financial players to identify, assess, and manage climate change. It was found from the analysis that this disclosure was also evident but minimal. This can be found in Disclosure 4_Disclosure of Green Efforts, where in 7.A., some of the processes to ensure compliance with the environmental laws was disclosed. The processes involved reporting by third party consultants and accredited laboratories. In Disclosure 1 -Assurance and Disclosure 3 - Disclaimer, we found that these are risk management techniques employed by the Issuer to manage the climate change. Although assurance is a risk management technique may not be an effective technique, disclaimer was found to be an effective clause to exempt, if not reduce the liability to be borne by the Issuers as seen in the case of CIMB Bank Bhd v Maybank Trustees Bhd and other appeals [2014] MLJU 117[2]. In addition to these, further analysis on the *wakalah sukuk* Information Memorandum has revealed that there was a use of force majeure clause in the 5 out of the 13 *wakalah sukuk*, i.e. in 1.A., 3.A., 4.A., 6.A. and 12.A.

However, climate change was disclosed in only four of them, i.e., 1.A., 3.A., 4.A. and 6.A. Some of the ways the disclosure was drafted are:

> *"An event of force majeure is an event which is not within the control of the party affected, which that party is unable to prevent, avoid or remove and shall include war and acts of terrorism, riot and disorders**, natural catastrophes** and others…"*

> *"An event of force majeure is an event which is not within the control of the party effected, which that party is unable to prevent, avoid or remove which arises from or is attributable to any cause whatsoever beyond the reasonable control of the party so prevented, including, without limitation, nationalization, expropriation or other governmental actions; political instability, overall domestic and international economic conditions, outbreaks of viruses, epidemic, pandemic or other communicable diseases, postal or other strikes, global conflicts*

[2] These cases have shed some light on few aspects of *sukuk,* i.e. the distinguished duties of trustee and lead arranger in *sukuk,* the adequate fulfilment of condition precedent (CP) of the *Sukuk* Facility Agreement (SFA) as to discharge the *sukuk* lead arranger's duty, the effect of a disclaimer in *sukuk* Information Memorandum (IM), and the effect of indemnity clause of a trustees over the issuer and its exemption.

or act of terrorism, act of God, earthquake, tsunami, fire, flood, storm or any type of inclement weather, war, riot, civil commotion, any order restricting the movement of the public or the imposition of curfew or any other governmental action implemented pursuant thereto, changes in applicable laws of Malaysia and others. Force majeure events do not include economic downturn, non-availability or insufficient or lack of financing on the part of the Issuer. The occurrence of a force majeure event may have a material impact on the Issuer's financial and business operations"

While some of the clauses specifically mentioned disease outbreak, pandemic, endemic etc., others are general where only the inclusion of 'natural catastrophes' as one of the force majeure events was made, as seen in 1.A. and 3.A. Since force majeure acts as an exit clause, it heavily depends on the wording and drafting of the clause (Cheah and Radzi, n.d.). Therefore, to consider force majeure clause as a risk management technique, adequate concern must be put on its drafting. Nevertheless, it is evident that climate-related disclosure was also made within this clause.

Under the fourth theme, i.e., Metrics and Targets, the financial players are recommended to set certain metrics and targets as assessment standards in order to assess and manage climate change. As seen in the analysis in Table 4 and Figure 1, there is insufficient evidence to support that disclosure under this theme was made by any of the Issuers.

Based on these findings, we concluded that climate-related disclosure by the Issuers is still inadequate, particularly on physical risk as well as disclosure under the governance and metrics and targeted themes. However, it is noteworthy that the documents used in this study are *wakalah sukuk* Information Memorandum which are intended for mostly experienced investors[3]. Thus, disclosure of the climate change may be minimal considering the backgrounds of the prospective investors. As a matter of fact, this study also focuses on the climate-related disclosure, instead of climate change reporting. While disclosure involves merely the information on the Issuer background, business activities and financial position, reporting involves a wider spectrum on how an Issuer reports all the input and output of its business activities. Hence, the disclosures are minimal.

In sum, we found that the climate-related disclosure of the Issuers in this study is partially in line with previous studies. Similar to what was reported in Abhayawansa and Adams (2021), climate-related disclosure is inadequate, among others, due to minimal details on the climate change impacts and strategies as well as relevant risk management techniques. In term of governance of the Issuer and merits and targets set up by the Issuer, insufficient evidence was found to support the existing of the disclosure. As concluded by Lombardi *et al.* (2021), the inadequate reporting was due to the early phase of compliance by the companies to the climate-related disclosure based on the European Commission guidelines. In similar vein, it can also be concluded that minimal disclosure of climate change among the Issuers in this study may also be due to the nascent climate change assessment and requirement in Malaysia. Therefore, the findings of this study may be useful for future climate-related disclosure and reporting by the financial player, particularly financial institutions in tandem with the initiatives of SC and BNM to follow the global standards. Given the small sample and limited documents in this study, future study can consider including bigger sample of financial players of different backgrounds to assess the climate-related disclosure.

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[3] Includes Sophisticated Investors, who are described as "high net worth individuals (with net asset threshold of RM3 million, excluding the value of primary residence), high net worth entities and accredited investors" (SC, 2021)

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Islamic Financial Engineering at the Crossroads: Between the Need for Hedging and the Compliance Requirements

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Abstract

Financial engineering is a vital need for the prosperity of Islamic finance. It offers solutions to create new opportunities, expand the existing market and create market niches for Islamic financial institutions. Despite its importance, the literature on Islamic financial engineering is scarce, and almost nothing exists from a practice perspective as this aspect is very secretive within Islamic financial institutions. The present paper is a theory-based-research attempting to gather, analyze in depth and present the thematic of Islamic financial engineering and related issues to its application, especially for market risk hedging. We first start with the theoretical background of Islamic financial engineering to identify its principles and understand the challenges it faces. As a case study, we delimit our research to Islamic explicit derivatives, which are designed instruments to hedge market risk. The analysis of those instruments shows that the current path of Islamic financial engineering is towards imitation and replication of conventional products rather than designing genuine conceptual alternatives. Finally, we argue that the imitation strategy is not inevitable; it is possible to do without within the mutuality framework.

Keywords: *Islamic financial engineering, hedging, Islamic derivatives*

1. Introduction

Financial engineering (FE) has several connotations and might have different meanings in different contexts. According to Finnerty (1988), FE encompasses the design, development, implementation and formulation of creative solutions to problems in finance. It is the process of employing basic financial tools to build complex structures in order to provide a suitable design for a new financial innovation (Alamad, 2017). The FE involves the design and evaluation of financial products that offer better risk-return combination while improving the profitability of the issuing institution (Al-Suwailem and Hassan, 2011). The output of FE may be a new consumer-customized financial instrument, new security or new process that ultimately results in the lowering of funding costs, increasing return on investments or expanding opportunities for risk sharing (Iqbal and Mirakhor, 2011). In the financial world, FE relates mostly to mathematical modeling of financial products with a particular aim of pricing financial derivatives and other financial structures (Al-Suwailem and Hassan, 2011). From a *Shariah* point of view, several principles should be respected when it comes to FE. Thus, Al-Suwailem (2006) suggests that Islamic financial engineering (IFE) is best described as a set of principles and strategies to develop innovative financial solutions. Indeed, as the operations and financial products offered by Islamic Financial Institutions (IFIs) are different from those of conventional banking, it is also the same regarding financial innovation and engineering (Alamad, 2017).

The process of FE can be viewed as either building complex instruments using basic building blocks or unbundling and repackaging different components of existing financial instruments (Iqbal, 1999). According to Iqbal and Mirakhor (2011), the types of financial innovation activities that have the most significant impact on the markets are those that enhance liquidity, transfer and share price and credit risk and, finally, generate

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revenues from credit and equity. The phrases FE, financial innovation and new product development process (PDP) are often used interchangeably; they form a family that leads to change and innovation. In practice, financial innovation is the generation of new ideas for a financial product to be built using FE within an overall process (i.e., set the steps) that is commonly known as PDP (Alamad, 2017).

Product development, within the Islamic finance (IF) framework, refers to the process of assets development through innovation and research, in the form of products and services, to satisfy consumer demand while respecting the precepts of *Shariah* or reengineering existing conventional products to make them *Shariah*-compliant (Ayub, 2007). Thus, two different approaches are to be considered as part of IFE; an innovative approach and a reverse engineering approach. The FE is of great importance for IF; its survival and development will depend on the degree of innovation and the originality of the offered products to investors willing to invest in compliance with *Shariah*. Besides, FE can create new opportunities, expand the existing market and create market niches for IFIs. Consequently, the IFIs will be able to offer more products to a broader range of customers and provide the market with an abundance of choices (Lahsasna and Hassan, 2011). The present paper firstly discusses the principles of IFE. These principles are necessary to set the basic requirements of IFE and measure the extent to which the current practices depart from these latter. Afterward, the challenges facing the IFE are presented and analyzed since they are crucial in understanding the current path of IFE. The third section of the paper gives examples of designed Islamic explicit derivatives (IEDs) to manage market risk. The choice of hedging as the primary concern of this paper can be justified on two grounds. First, many observers acknowledge that the IF industry will not sustainably be able to continue its growth, and may even regress, without a proper market risk management framework (Ayoub, 2013). On the other hand, risk management is the most significant activity within FE, to the point that this latter is sometimes made equivalent to financial risk management (Fabozzi and Drake, 2009). Al-Sabhany (2019) pointed out that hedging purposes overwhelmed the FE, and this latter is likely to become concerned solely by finding solutions to hedging problems. This is not surprising since FE is mainly in demand because the financial world has become riskier (Azmi *et al.*, 2015). In the last section, the IEDs compliance with the principles and objectives of IFE will be discussed.

2. Principle of Islamic Financial Engineering

Beekun and Badawi (2005) argued that Islam is a full way of life, not just a religion. Accordingly, when we address the subject of IFIs, we should bear in mind that the noun ‘finance’ suggests that these institutions deal with financial credit and risk allocation. Thus, IF must be, in essence, similar to other forms of finance. However, the adjective ‘Islamic’ suggests some fundamental differences between IF and its conventional counterpart (El-Gamal, 2006). That said, business ethics and the *Shariah* objectives cannot be ignored or separated in FE and product development (Alamad, 2017), which is also the case for any field within IF. Therefore, the IFE is governed by a set of principles [1] that distinguish it from its conventional counterpart.

2.1 Principle of balance

According to Al-Suwailem (2006), this principle stresses the balance between self-regarding and other-regarding interests, between for-profit and non-profit activities, between competitive and cooperative relations. Therefore, there should be a balance between personal interests and those of society and between for-profit activities and charitable ones. The balance principle puts the approach of IF halfway between capitalism and communism. Accordingly, social welfare, the greater good and benefit of individuals and society should be the motivation to any financial innovation (Alamad, 2017). As a corollary, instead of seeking profit maximization by any means, as an objective of FE, Islam encourages value maximization within the boundary of ethical principles (Alamad, 2017). According to Iqbal and Mirakhor (2011), by keeping the objectives of *Shariah* in sight, the FE will lead to an increase in overall social welfare.

The balance principle is generally backed by cooperation that should be promoted in parallel with competition to achieve higher goals. Indeed, objectives can be achieved more effectively through a cooperative approach instead of the recommended arrangements and contracts under conventional finance (Al-Suwailem, 2006). El-Gamal (2007) argued that mutual structures (i.e., based on cooperation), in financial intermediation

[1] We adopt the division made by Al-Suwailem (2006), Al-Suwailem and Hassan (2011) and Iqbal and Mirakhor (2011).

of credit and risk, are a solution that can help significantly in implementing the substance of *Shariah* as well as its forms. In practice, mutuality is essential for IFE since it has the power of deactivating riba (interest) and gharar (uncertainty), which do not apply to donations. The principle of balance will prevent developing zero-sum structures where the payoffs of one agent are the negative of the other.

2.2 Principle of acceptability and freedom of contract

This principle is a cornerstone of IFE. It stipulates that there is no limitation to innovation and creativity as long as it does not cause more harm than good. Accordingly, individuals have full freedom of contract, and the contracting parties are free to engage in any transactions not prohibited by *Shariah* (Iqbal and Mirakhor, 2011). In practice, it is necessary to ensure that a transaction or a contract is not vitiated by *ḥaram* and does not contain elements of *gharar*, *riba* or injustice. When we face a discrepancy about the illegal aspect of a contract, the proof is borne by the party believing that it is *ḥaram*. The freedom of contract implies that transactions are permitted unless a legal text stipulates the opposite. Nevertheless, one should distinguish a contract or a transaction considered as *ḥalal* from the financial instrument used to facilitate its implementation, which could be ḥaram (Mirakhor, 2010). For example, *murabaḥah* is accepted by scholars as it is described in fiqh books, while the use of the binding promise to structure the deal is highly controversial. The principle of acceptability has significant implications. It will provide IFE with the basic building blocks to be used to structure more complex financial instruments with specific characteristics regarding risk and return.

2.3 Principle of integration

One of the key differentiators between conventional and Islamic product development is that the latter is either asset-based or asset-backed (Alamad, 2017), which is a direct consequence of the principle of integration. This latter emphasizes that financial and economic activity should be tied together. The linkage between the two spheres will prevent the emergence of a dichotomy between the real and the financial sector. This dichotomy is problematic since Islam promotes the integration of the two sectors to achieve balance and sustained economic growth. Thus, the IFE should rely on asset-linked securities (Iqbal and Mirakhor, 2011) since money-for-money instruments are unacceptable if performed for profit (Al-Suwailem, 2006).

The argument of using conventional derivatives to manage risk may, therefore, be challenged because these instruments evolve independently of the real economy. Indeed, the notional value of outstanding derivatives worldwide reached US$ 648 trillion in 2020 (SIFMA, 2021), which is greater than 7.5 times the global GDP during the same period[2]. Al-Suwailem (2006) pointed out that conventional derivatives operate a risk commoditization by creating a market for it. Such a situation will, in the long run, result in risk proliferation rather than risk reduction.

The principle of integration has several implications for IFE. Indeed, the realm of Islamic contracts, which are usually used for trading, financing and investing, should be extended to serve other purposes (e.g., hedging).

2.4 Principle of consistency

Consistency is a fundamental principle of IFE. It stresses that the form and the substance of an Islamic product must be consistent with each other; the product's form is to serve its substance. In general, *Shariah* emphasizes that every contract must comply with its legal form, its essential requirements and its nature and implications (Hamour *et al.*, 2019). Therefore, any attempt to develop a product or a process that runs not adhering to the objectives of *Shariah* will not be accepted. If we consider the case of murabaḥah, which is deemed a *ḥalal* financing transaction, one must pay attention to form's rules that can render it illicit (e.g., the sale of a commodity before its possession). In sum, both the form and the substance of a contract are binding. Nevertheless, many studies raised various criticisms on the application of certain techniques to validate the contracts as *Shariah*-compliant, while their economic substance is quite similar to their conventional counterparts (Hamour *et al.*, 2019). These form over substance techniques, which are paradoxically based on IFE, lead to a growing substance gap in the IF industry. It is worth noting that the debate on Islamic derivatives amounts mainly to a fundamental dispute over form versus substance in Islamic law (Uberoi and Khadem, 2011). The debate has given attention to the application of "form," hence circumventing the "economic substance" of Islamic financial transactions, which raises concerns regarding how authentic some Islamic

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[2] According to the World Bank's website, the global GDP is valued at US$ 84.86 trillion during 2020 (see, https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?end=2020&start=1960&view=chart).

financial transactions are (Hamour *et al*., 2019). The consistency principle calls for much diligence in the application of form or substance when developing *Shariah*-compliant products and services to ensure the compliance of the contracts in line with their objectives (Hamour *et al*., 2019).

3. Challenges Facing Islamic Financial Engineering

The pace of IFE development has been very slow compared to the conventional one (Iqbal and Mirakhor, 2011). This delay is attributable partly to a set of challenges it faces. Besides the existing regulatory framework that does not accommodate the nature of Islamic financial products (Alamad, 2017), IFE is facing many other challenges.

3.1 A fragmented Shariah approach

Shariah governance plays a key part in deciding whether the financial innovation or product is acceptable to be developed and offered in the market by an IFI or not (Alamad, 2017). Indeed, introducing a new product requires considerable effort as it has to receive approval from *Shariah* scholars, not all of whom are necessarily well-versed in economics and quantitative finance (Iqbal and Mirakhor, 2011).

Differences of opinion and interpretation regarding the commandments about the economy and transactions can hinder the progress of the Islamic financial industry. This heterogeneity testifies to the difficulties of reconciling financial innovation with a principled interpretation of different sources of religious doctrine via analogous deduction (i.e., qiyas), independent analytical reasoning (i.e., ijtihad) and scholarly consensus (i.e., ijma') (Rafay *et al*., 2016; Jobst, 2013). However, if these differences are handled within the agreed-upon principles, it will provide a fertile environment for innovation and creativity. These differences will be considered as diversity in the application of *Shariah* instead of inconsistencies and contradictions (Al-Suwailem and Hassan, 2011). A study conducted by the International *Shariah* Research Academy for Islamic Finance (ISRA) on *fatwas* (Islamic rulings) reveals that there are more similarities than differences in *Shariah* resolutions between Asia and the Middle East, contrary to popular belief (Noripah and Tsu, 2013). This convergence is a good sign that the Islamic financial industry is going toward standardization and harmonization.

3.2 The product development process (PDP) in Islamic finance

The lack of a systematic and well-defined PDP within IFIs is one of the biggest challenges to innovating new products. In practice, the new Islamic products are introduced by imitation of other Islamic banks or, worse, the conventional ones. It is worth noting that conventional banks are leaders in developing Islamic products. Since the environment in these institutions is not Islamic, these products become a simple adaptation of conventional products instead of original value-added products (Al-Suwailem and Hassan, 2011). However, one should keep in mind that imitation is among product development strategies. It is by far the easiest strategy because the target of the development process is already known. Therefore, imitation can help, especially in the early stage of IF (Al-Suwailem, 2006). El-Gamal (2006) pointed out that Islamic banks are primarily mimicking the financial products offered by conventional banks rather than creating genuine Islamic financial products that serve the real economy. Effects of imitation can be harmful in the long term due to the emergence of path dependencies; if we maintain imitation, change is made increasingly difficult (Mirakhor, 2010). Hence the need to move from imitation to mutation and, finally, to a FE that is based on the customers' needs.

3.3 The specialized institutions and developed markets

The developed products will not work in a vacuum; they must be implemented by institutions whose structure is critical to define the appropriate products (e.g., equity investment is more suited to venture capital funds and investment banks than to commercial banks) (Al-Suwailem and Hassan, 2011). According to Belabes (2020), the path to follow by the products is decided by the current system of financial markets. Institutions and markets will play a key role in testing, approving and marketing the new products. In practice, specialized institutions can be assimilated to "labs" or "factories" without which a new product could not prove its practical scope and effectiveness. Besides, without suitable markets, designed financial solutions remain mere ideas or prototypes (Belabes, 2020).

It is worth noting that developed products within the IF framework lack a secondary market (Ibrahim, 2019; Ajmi *et al.*, 2014), which prevents IF from operating in large parts of the world. The small Islamic secondary markets currently lack depth and breadth (Noripah and Tsu, 2013). Regarding conventional markets, they are equipped with tested, liquid, well-established and standardized instruments. This situation will render the launch of new [Islamic] products, which are not approved by the major players in the field, difficult (Iqbal, 1999).

3.4 Gaps within the theoretical framework

The interest rate has always been an important variable in portfolio theory, general capital theory and to practitioners (Merton, 1973). Indeed, modern finance theory and subsequent financial innovations hinge on the concept of a predetermined interest rate, which has become an integral part of all major asset-pricing models (Iqbal, 1999). Even in lending, the risk of losing the principal as well as interest coexist, but a great deal of attention is paid to the risk element in fixing the rate of return (i.e., interest) (Knight, 1921). Therefore, any attempt of FE to create a new instrument without any reference to interest appears to be a challenging task (Iqbal, 1999).

The concept of time value of money forms the basis of major financial decisions. Cash flows occurring at different points in time are not comparable; they cannot be added or subtracted without computing their time-adjusted equivalent values (Obaidullah, 2007). For many researchers, discounting does not comply with *Shariah* since it encompasses *riba* (Akkizidis and Khandelwal, 2008). Others proposed using a *ḥalal* rate of return[3] (Gharbi, 2016; Askari *et al.*, 2010; Mirakhor, 2010; Obaidullah, 2007) and those Islamic banks and financial institutions should strive for developing their benchmark. Nevertheless, one should distinguish the interest rate functions' and its institution (Naqvi and Qadir, 1986). A fundamental point that is missed by most Islamic critics of discounted cash flow (DCF) model is that the discount rate is not an interest rate in the sense of being a fixed rate of interest with no risk of capital loss; it is the yield investors expect given the uncertainties they face (Tomkins and Abdul Karim, 1987). Additionally, it is necessary to distinguish between the use of the interest rate to determine a *ḥalal* profit and the fact of collecting interest on a loan, which is the forbidden *riba*. Thus, in a contract, it is not the method of calculation that must be considered, but the event giving rise to the remuneration (Causse-Broquet, 2012). The interest rate in IF is comparable to an instrumental variable that has no ontological content while being very useful for the valuation of assets and other financial calculations.

Finally, it is worth noting that although academic research on Islamic economics and finance has made healthy progress, it has not developed fully to the point where it can tackle some critical issues such as asset pricing, risk premium, risk mitigation and hedging (Kafou, 2020; Kafou and Chakir, 2015; Iqbal and Mirakhor, 2011).

3.5 Lack of specialists in the field of IFE

It is worth noting that the lack of qualified human resources is a general problem of IF. Indeed, *Shariah* scholars are in great demand, and many of them sit on multiple boards across the world (Alsartawi, 2019; Oseni *et al.*, 2016; Malek, 2013). The multitude of mandates is explained by some authors, not by competence, but because there is a shortage of *Shariah* scholars who will give the judgments (i.e., fatwa) that the IFIs are looking for (Al-Masri, 2009; Power, 2009). When it comes to the IFE, the problem of qualified human resources is more complicated since this field requires multidisciplinary expertise.

According to Iqbal and Mirakhor (2011), no effort to introduce FE into the Islamic financial system can take place without a proper understanding of its basic building blocks and principles that can be used to build more sophisticated instruments. While practitioners in the conventional capital market are well trained and have technical skills and expertise in the understanding of the risk and return of basic financial instruments, Islamic financial markets are lagging behind in their professional and research resources (Iqbal, 1999). It is, therefore, essential that multidisciplinary expertise, covering topics ranging from theological interpretation to financial structuring, be developed through knowledge-sharing, cross-training and acquiring an understanding of the functioning of markets (Iqbal and Mirakhor, 2011).

[3] For example, the interest rate can be replaced with the average rate of return to the real sector of the economy or the GDP growth.

4. Application of Islamic Financial Engineering for Market Risk Hedging

Al-Sabhany (2019) argued that the conventional financial system was built upon an invalid basis (i.e., *faṣid*) regarding many aspects. The first is that it tries to dissociate return from the risk of an investment, and, secondly, this risk is permitted to be transferred to a third party through agreed-upon contracts. Hedging in IF may seem to oppose the legal maxim of *al-kharaj bi-ḍaman*, which stipulates that entitlement to profits is subject to the responsibility for attendant expenses and possible loss (Kafou and Chakir, 2015). Nevertheless, *ḍaman* must be understood as guaranteeing the object of the contract (i.e., damage), not the market conditions surrounding it (i.e., price variations) (Al-Qari, 2008). Strong suggestions from *Shariah* on managing risk as a way of wealth protection and its preservation from loss or damage, which is in line with *Shariah*'s objectives, has led many scholars of the past and present to support hedging (Dusuki and Mokhtar, 2010; Razif et al., 2012). Thus, as pointed out by Al-Suwailem (2006), hedging is not an issue within IF; the issue is how to reach this goal and what means should be used to meet this end.

Islamic banks face a mixture of risks they share with conventional ones and some specific risks. Islamic banks share the market risk, credit risk and liquidity risk with conventional banks. Besides, the IFIs bear their specific risks; these include the displaced commercial risk, *Shariah* compliance risk and associated risks with profit-and-loss (PLS) financing modes. The displaced commercial risk arises when an Islamic bank is under pressure to pay its investment depositors a rate of return higher than what should be payable under the actual terms of the investment contract. This situation may occur when the bank has underperformed during a period and was unable to generate adequate profits for distribution to the account holders (Iqbal and Mirakhour, 2011). The *Shariah* risk can be defined as the possibility of a transaction being refused based on its non-compliance with *Shariah*.

Derivatives are powerful instruments in managing market risks. Nevertheless, conventional derivatives are, for many considerations, not permitted within the IF framework. Consequently, *Shariah*-compliant alternatives were structured. Islamic derivatives can be classified as implicit, legacy and explicit derivatives (Idris and Muhammad, 2018; Jobst and Solé, 2012). This section will deal with IEDs that are intended to hedge market risks.

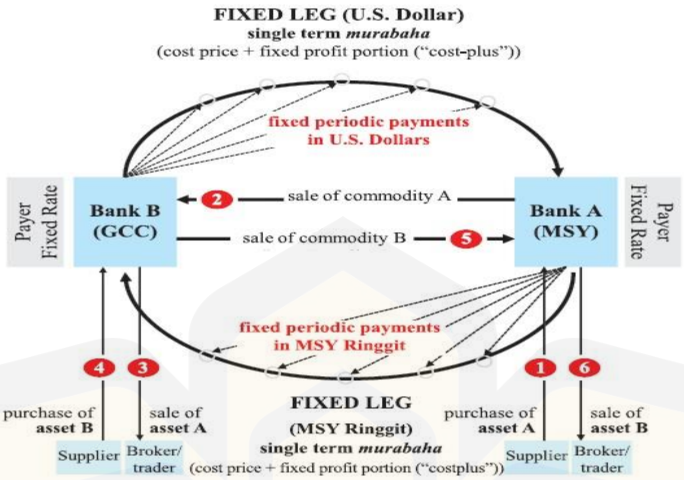
4.1 Currency risk hedging

Currency risk, also called exchange-rate risk, is the risk that the relative values of the domestic and foreign currencies will adversely change in the future (Fabozzi and Drake, 2009). This section deals with two instruments that can be used to hedge currency risk, namely *Murabaḥah*-Based Cross-Currency Swap (MB-CCS) and *Wa'd*-Based FX Option (WB-FXO).

4.1.1 Murabaḥah-based cross-currency swap

To understand the mechanism of MB-CCS, let us consider the example of an Islamic bank located in Malaysia, with incomes in Ringgit (MRY), facing USD payments over a fixed period. To cancel any currency mismatch, the CCS will substitute the bank's future cash outflows in USD for ones in MRY. To do so, the Malaysian bank can enter into an MB-CCS with a dollar-paying counterpart. The arrangement is structured as follows: The Malaysian bank buys a commodity "A" in local currency (step 1) and sells it to a foreign bank through a *murabaḥah* contract. Payments will be made in installments over an agreed-upon period (step 2). The foreign bank will sell a commodity "A" (step 3) and will buy a commodity "B" in USD (step 4) that it will resell to the Malaysian bank (step 5). The Malaysian bank will, in turn, resell the received commodity to one of its clients (step 6). The Malaysian bank will receive cash flows in MRY that will be assigned to the foreign bank while this latter will accept payments in USD that will be transferred to the Malaysian bank account. By combining the two *murabaḥah* contracts, each denominated in a different currency, both parties receive cash flows in the desired currency. Figure 1 shows the operation of the MB-CCS.

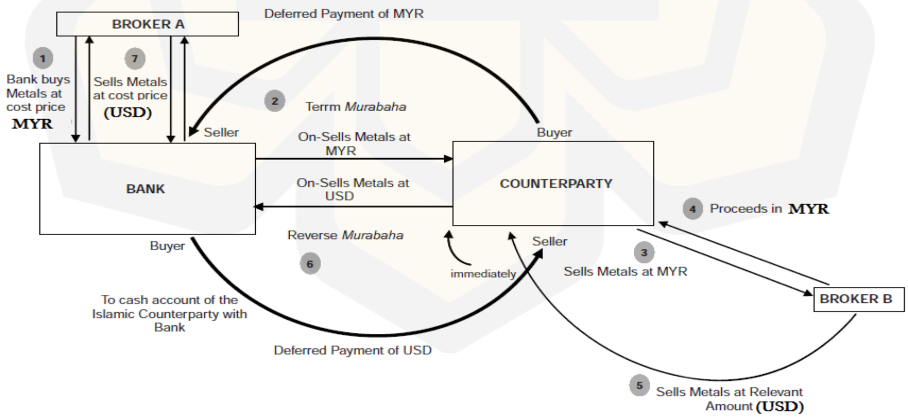
Figure 1: MB-CCS (USD/MYR)



Source: Jobst (2013)

The exchange rate used to calculate the amount of each installment is the prevailing rate at the moment of contracts' entry. Thus, the exchange rate is locked during the period of the MB-CCS. Note that when the CCS is used as described in Figure 1 (i.e., selling different commodities to different clients), nothing is objectionable about it as long as the commodities are not *ḥaram* or require spot payment (e.g., gold). Nevertheless, this swap structuring will require having two parties with an identical profile (regarding the position in *murabaḥah*) but expressed in different currencies. Besides the low probability of such coincidence, hedging will be, in this case, driven by clients' demands, not the institutions' needs. Consequently, in real life, London Metal Exchange-traded metals, such as copper and aluminum, are often used as commodities. Moreover, clients and suppliers are replaced by brokers, and the same commodity is often traded between parties, as shown in Figure 2.

Figure 2: MB-CCS (MYR/USD)



Source: Adapted[4] from Uberoi and Khadem (2011)

These changes render the MB-CCS more realistic and adapted to the IFIs' needs. It is worth noting that, often, it is only one party that needs hedging. In this case, the agreed-upon mark-up in *murabaḥah* may include a risk premium whose direction and size will reflect the service rendered.

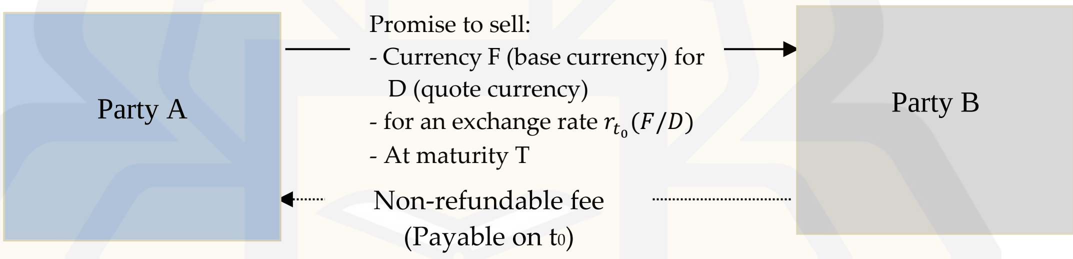
[4] Here, some cash flows' currency was changed to reflect that the counterparty needs MYR for a specific period.

There were many applications of MB-CCS for currency risk hedging. In July 2006, Standard Chartered arranged the first such operation on behalf of Bank Muamalat Malaysia (Jobst, 2013). In October 2006, Citigroup designed a currency swap for the Dubai Investment Group (DIB) to hedge the currency risk on DIB's 828 million MYR (approximately £119 million) investment in Bank Islam Malaysia (Uberoi and Khadem, 2011). Standard Chartered Saadiq and DIB are marketing products based on *Shariah*-compliant CCS (ADIB, 2020; Standard Chartered, 2020).

4.1.2 Wa'd-based FX option

The *wa'd* (i.e., promise) is used to structure the WB-FXO. This product works as follows: One party "A" makes a promise to sell a particular amount of a currency "F" against another currency "D" at a predetermined date based on a predetermined rate $r_{t_0}(F/D)$[5]. The opposing party "B" acknowledges the issued promise without making any promise to "A." In return for the received promise, "B" will pay a non-refundable fee to "A" regardless of whether the promise will be enforced or not. Obviously, "B" will enforce the promise only if $r_{t_0}(F/D)$is below the prevailing exchange rate at the maturity date. Figure 3 shows the mechanism of WB-FXO.

Figure 3: *Wa'd*-Based FX Option.



Source: by author

The WB-FXO bears a remarkable resemblance to the conventional FX options. Thus, the paid fee for the promise will not deviate from the conventional FX option's premium. In February 2009, the Gulf Finance House announced a partnership with Deutsche Bank in a foreign exchange hedging deal worth over 30 million Euros (39.4 million USD) using a WB-FXO (Uberoi and Khadem, 2011). RHB Islamic Bank Berhad also markets WB-FXO structures (RHB Bank, 2019).

4.2 Profit rate risk hedging

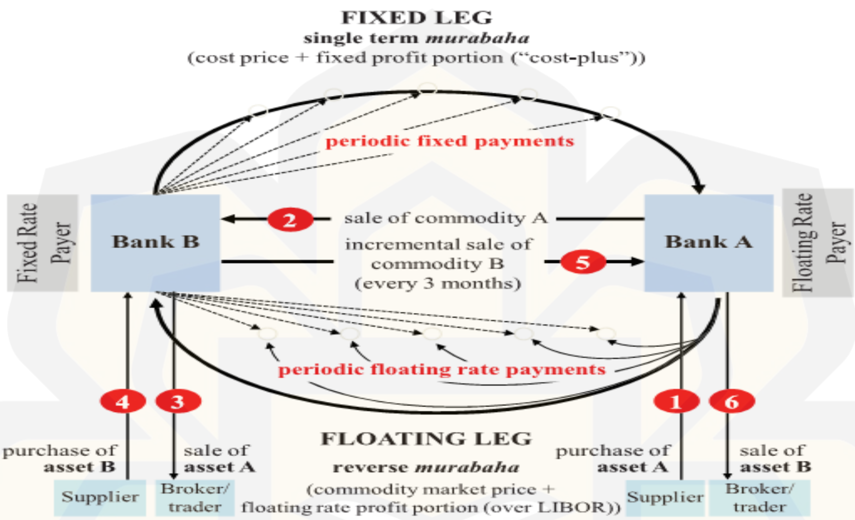
The profit rate risk may be viewed as an Islamic version of interest rate risk. This latter is the risk of interest rates change, resulting in a change of the value of a claim or investment. For a financial institution, the interest rate risk is the risk to earnings or capital arising from differential changes in the value of assets and liabilities as interest rates shift (Morrison and Pyle, 1978). Because of interest payment and receipt prohibition, it is usual to admit that the IFIs do not face interest rate risk. However, these latter are indirectly affected by this risk because of their profit rate offer. In practice, many IFIs use LIBOR as a benchmark in their profit rate calculation. Thus, if these benchmarks change, IFIs can face the interest rate risk in the sense of their paying more profit to future depositors as compared to receiving less income from the users of long-term funds (Al-Amine, 2008).

The IFIs can use the *Murabaḥah*-Based Profit Rate Swap (MB-PRS) to manage their exposure to fixed and floating rates of profit. Thus, a bank "A" wishing to convert a portion of its income from a floating to a fixed rate of profit may enter into MB-PRS with another bank "B" needing to carry out the opposite position. The deal is structured as follows: Bank "A" buys a commodity to bank "B" for a fixed rate of profit. The latter will

[5] That is the number of units in currency "D" needed to buy one unit of currency "F."

buy another commodity and resell it to the bank "A" at its market price plus a floating rate of profit. In fixing this rate, banks use a benchmark (e.g., LIBOR), and the profit rate is often equal to LIBOR plus a fixed number of basis points. Bank "A" will pay a floating rate of profit and buys the commodity by periodic increments every three months[6] as opposed to bank "B," which buys the entire quantity at the MB-PRS's inception. The MB-PRS implies the full and effective payment on each due date, and both parties sell their commodities to recoup their initial pay-out. Figure 3 shows the mechanism of MB-PRS.

Figure 3: *Murabaḥah*-Based Profit Rate Swap



Source: Jobst (2013)

As for MB-CCS, metals such as copper and aluminum are often used, the clients are replaced by brokers, and the same commodity is traded between the parties. Thus, the same adjustments of MB-CCS are to take into consideration[7]. Usmani (2012) argued that using interest rate as a benchmark does not render a transaction invalid, *ḥaram* or prohibited, because the deal itself does not contain interest. The MB-PRS was introduced by the Commerce International Merchant Bank of Malaysia in 2005. In October 2006, Standard Chartered Saadiq entered into a 150 million USD three-year profit rate swap with Kuwait-based Aref Investment Group SAK (Uberoi and Khadem, 2011). Standard Chartered Saadiq is still offering *Shariah*-compliant PRS (Standard Chartered, 2020).

4.3 Hedging price risk using wa'd based total return swap

The price risk is the risk of a price decline or a loss due to adverse price movement (Fabozzi and Drake, 2009). Managing such a risk is crucial for IFIs. In practice, the risk of equity portfolios and commodities, which are widely accepted as *Shariah*-compliant investments, is primarily a price risk. The *wa'd* Based Total Return Swap (WB-TRS) was introduced to deal with such a risk.

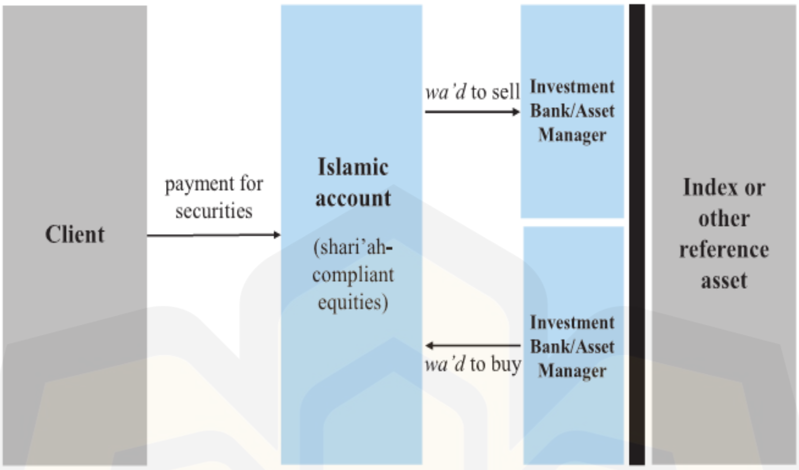
4.3.1 Modus operandi

The WB-TRS was launched in 2007 by Deutsche Bank. It was a controversial product because it allows Muslim investors to get the performance of non-*Shariah* compliant assets (Atallah and Ghoul, 2011). The WB-TRS is structured using a double binding promise. The first is a promise to sell a *Shariah*-compliant asset, and the second is a promise to buy this latter at a price that will be set according to an agreed-upon benchmark. The asset, the portfolio or the index serving as a benchmark may be Islamic or conventional. The mechanism of WB-TRS is described in Figure 4.

[6] Three months can be replaced by any period depending on the benchmark's change frequency.

[7] Cf. Uberoi and Khadem (2011) for such a configuration of MB-PRS.

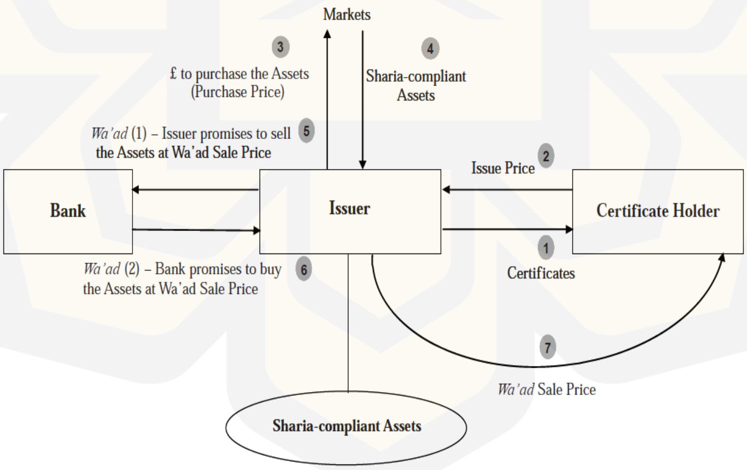
Figure 4: WB-Total Return Swap



Source: Jobst (2013)

The WB-TRS can also be structured using an SPV to issue trust certificates. The WB-TRS will, in this case, link the return of the certificates to the desired benchmark rather than the performance of the underlying assets. This way of structuring will help to issue *sukuk* that mirror perfectly the cash flows of conventional bonds. Figure 5 explains the mechanisms of WB-TRS with investment certificates issuance.

Figure 5: WB-Total Return Swap with investment certificates issuance.

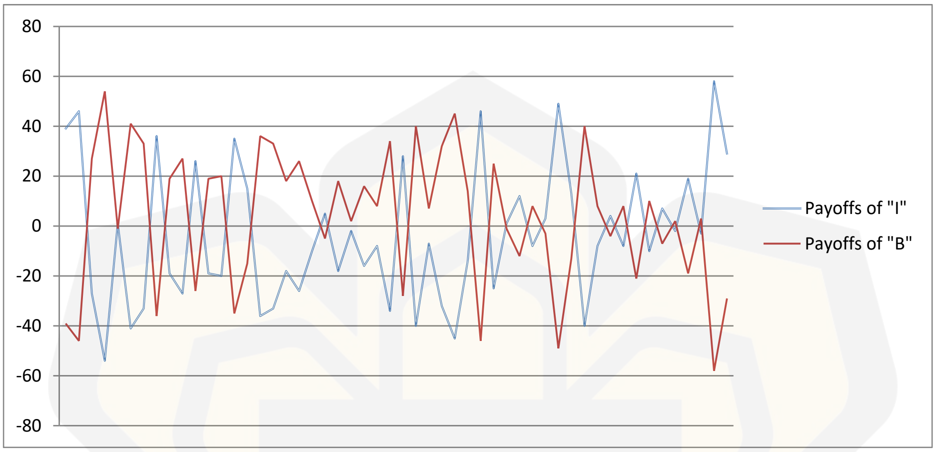


Source: Uberoi and Khadem (2011)

4.3.2 *Profit and loss analysis*

Consider an investor "I" with a *Shariah*-compliant asset "C" valued at 100 for which he wants to swap the profit by entering into a WB-TRS with another investor "B." The chosen benchmark is a conventional mutual fund whose current value is 100. Thus, each party issues a binding promise to sell or buy "C." At the maturity date, if the price of "C" is lower than the benchmark, the investor "I" will enforce the promise to buy. He will collect the benchmark's price in the counterpart of his *Shariah*-compliant asset. As a result, he will make a gross profit[8] equal to the price difference between the benchmark and the asset "C." In the opposite scenario (i.e., C >benchmark), investor "B" will require fulfilling the agreement to sell asset "C" against the payment of the benchmark's price. The patterns of profits and losses for both parties are given in Figure 6.

Figure 6: P&L for a random simulation of price changes of asset "C" and the benchmark.



Source: by author.

Figure 6 shows that WB-TRS is a zero-sum game (ZSG). Indeed, losses of one party are gained by the other. The ZSG schemes are very far from the spirit of Islam and the principles of IFE, especially the principle of balance. Thus, the WB-TRS may seem *Shariah*-compliant, but its essence is not in line with *Shariah*'s objectives. Besides, the associated risk with the WB-TRS is important and can expose investors to toxic assets. Another issue with the WB-TRS is allowing access to the performance of non- *Shariah* compliant assets. Using a conventional benchmark in the WB-TRS is problematic and cannot be compared to the use of LIBOR for pricing. As explained by DeLorenzo (2007), while the LIBOR is used to indicate the return, the benchmark in the WB-TRS is used to deliver the return.

5. Discussion of IEDs' Issues

The prevailing opinion of the non-permissibility of conventional derivatives has left IF short of risk management tools (FitchRatings, 2020; Kafou and Chakir, 2015). In this context, a middle position emerged. This latter asserts that although conventional derivatives fail to comply with some of the formal and substantive requirements of Islamic law, these obstacles may, nevertheless, be overcome by drawing upon the rich internal resources of Islamic jurisprudence (Nafis, 2019; Kafou, 2017; Uberoi and Khadem, 2011). This position was the influential motivation behind IEDs that, to preserve *Shariah* compliance, should be used only for hedging purposes. Besides, the IEDs must meet the needs of the contracting parties without complexity in their implementation.

According to Al-Suwailem (2004), to go mainstream, Islamic products must satisfy two properties: *Shariah* compliance and economic efficiency. The first one is best achieved by avoiding the areas of *khilaf* (i.e., diverging opinions among scholars). For the second, the developed products within IFE must be, at least, as economically effective as conventional ones. After a brief description of the main IEDs in the previous section, it is clear that they fail to satisfy neither the first property nor the second. Even more, those products violate the core principles of IFE. For the MB-CCS[9], it is easy to see that its *Shariah* compliance is debatable. Indeed, MB-CCS involves many of *boyou'al-wafā'*[10]. The first is between the Bank and Broker "A," the second is between counterparty and broker "B," and the third is between the bank and counterparty (see, Figure 2). The arrangement may be worse if the used exchange rate is different from the spot one, leading to *bay 'al-'īnah*.

[8] Both parties may incur several transaction costs, fees and taxes.

[9] Note that the same criticism also applies to MB-PRS.

[10] *Bay' al-wafā'* is a sale where the seller has the option to buy back a commodity.

The WB-FXO, in turn, embodies many violations of *Shariah*. On the one hand, the binding promise is highly controversial when used for commutative transactions. On the other hand, the WB-FXO allows paying for a contingent claim, independently from the sale contract, which is deemed illicit in IF (Al-Suwailem, 2006). The ZSG structure of payoffs is a common feature of WB-FXO and the WB-TRS. Besides, the WB-TRS is structured using a bilateral binding promise. The two promises to buy and sell the same asset sum up to a bilateral binding promise.

When analyzing the IEDs of the previous section, it appears that they are mainly structured using the imitation strategy. In practice, if one tries to figure out the difference between the WB-FXO and a conventional FX option, the answer would be "nothing," especially when it comes to the conceptual side. Differences may only emerge from pricing, transferability or other technical details. Malek (2013) pointed out that the goal of IEDs is to replicate, as accurately as possible, conventional derivatives rather than being genuine conceptual alternatives. This replication is "blatant" in the case of the WB-FXO, while it is more "hidden" in the MB-CCS. Since imitation implies the same objective of conventional instruments, but with the additional constraints of *Shariah* rulings, it follows that Islamic products will always be inferior to conventional ones (Al-Suwailem, 2006).

According to Kamali (1999), the applied aspect of derivatives is mainly a question of designing suitable trading formulae and products that would appeal to the market participants and ensure the viability and survival of this line of trading on the market floor. Thus, the requirement is not only that Islamic derivatives can function as risk management tools; it is also crucial that their price be competitive. Nevertheless, as explained by Mohamed et al. (2013), the requirement to be *Shariah*-compliant, for some companies, may render pricing less of an issue. It is the case because these companies are choosing within the Islamic space, not from the entire universe comprising both conventional and Islamic products.

The first major problem of IEDs is the multitude of sales and purchases for the sake of form. In practice, the set-up of IEDs is quite complicated and involves many parties and transactions, which will undoubtedly increase their cost. For example, the intervention of brokers and the use of commodities are just a matter of form in the MB-CCS. With its complexity and additional costs, it is hard for the MB-CCS to compete with its conventional counterpart. In most cases, the IEDs are backed by stocks of non-precious metals (e.g., copper) (Uberoi and Khadem, 2011), which are often resold several times without leaving their warehouses (Awidah, 2010). This process will produce huge transaction costs for the only purpose of creating a form of integration that Al-Suwailem (2006) called "artificial integration." Ayoub (2013) pointed out that such activity is likely to result in distortions in commodities' pricing due to artificial elements of supply and demand, which, in turn, has negative implications to their users in the real sector who have no relation whatsoever to the swap contract. Al-Sabhany (2019) argued that giving complete freedom to financial markets and institutions may be detrimental to the real economy.

Introducing other parties (e.g., brokers) and trades (e.g., buying and selling) into a deal will result in the loss of the deal's *Shariah* qualification. A mechanism that El-Gamal (n.d) called "degrees of separation." According to El-Gamal (n.d.), the idea of making a transaction ḥalal by using degrees of separation is not new; it underlies most schemes (i.e., ḥiyal) to circumvent *Shariah* restrictions. As a result, simplification rules are necessary for IFE to requalify a transaction. DeLorenzo (2007) argued that the objective of some structures' mechanism (e.g., WB-TRS) is to use non- *Shariah* compliant assets and their performance to bring returns into a so-called *Shariah*-compliant investment or investment portfolio. He qualified this stratagem as "*Shariah* Conversion Technology."

The binding promise is another major problem of IFE. According to Al-Masri (2002), the debate among the early scholars about the bending promise was moved from the category of the voluntary offer (i.e., *tabarruʿāt*) to that of the commutative contracts (i.e., *muʿāwadāt*). It is worth noting that the Islamic Fiqh Academy (IFA) ruled that the unilateral promise is by religion binding except where otherwise justified and can also, sometimes, be judicially binding (IFA, 1988; Al-Masri, 2002). A relevant criticism of the unilateral binding promise is its use as an alternative to a proscribed contract, such as selling goods that are not in one's possession (Al-Masri, 2002; Al-Sabhany, 2019). Using unilateral binding promise for hedging will result in arrangements where the objective is neither reducing nor sharing the risk; the concern becomes about who accepts to bear the risk when others decide to avoid it. In practice, the unilateral binding promise is a way to introduce ZSG schemes into the IF. It is worth noting that the bilateral binding promise (i.e., *muwaʿada mulzima*) is ruled out even by the IFA. For Hamour *et al.* (2019), having a different substance from what it was initially intended for does not necessarily make the use of waʿd erroneous; it must be evaluated based on its new effect in society.

The use of controversial building blocks (e.g., binding promise and *tawarruq*) to structure IEDs may raise some divergence regarding compliance and, thus, a legal risk. Legal risk [for a derivative contract] is the risk that the legal system will fail to enforce a contract (Chance and Brooks, 2010). In the case of IEDs, this risk is compounded. Indeed, if the transaction is governed solely by *Shariah* law as a matter of form, the opinion of *Shariah* courts could override commercial legal concepts, which might requalify the legal nature of a transaction (Jobst and Solé, 2012). As a result, the outcome of the IEDs becomes unpredictable, which brings some additional uncertainty to the position to hedge. To get around different interpretations of *Shariah*, experts recommend developing products that are more broadly accepted by most jurisdictions (Ghoul, 2012). Therefore, it is essential to avoid areas of divergence because they render the process of seeking contractual enforcement lengthy, cumbersome and expensive (Jobst and Solé, 2012).

Finally, the IFIs that offer Islamic hedging instruments may need, themselves, to hedge their risk to bring in profit (FitchRatings, 2020; Mohamed *et al.*, 2013). This problem is more pronounced for purely Islamic structures than for Islamic windows. Actually, controlling the use of [conventional] derivatives for hedging the group level positions is beyond the reach of *Shariah* supervisors of an Islamic window in a conventional bank (Khan and Ahmed, 2001).

6. Summary and Conclusion

Innovation is believed to be one of the key ingredients for economic growth; it leads to national wealth creation and prosperity. Therefore, innovation is often perceived as the ultimate solution to existing economic issues in the society (Alamad, 2017). Within the financial activity, FE is the framework to materialize new ideas for financial products. The application of FE is the key to the rapid development of secondary markets and of liquidity-enhancing products, which will result in effective risk management (Iqbal and Mirakhor, 2011). The IFE is in its infancy, and the developed products within the IF are still lacking breadth and depth. In fact, the IF industry is dominated by short-term instruments such as *murabaḥah* and *ijarah* contracts while it [still] lacks liquidity and risk management instruments (Iqbal, 1999). Hence, the IFE is called to provide innovative and creative solutions that can compete with conventional ones.

The analysis of IEDs showed a gap between the theory of IFE and the current practice. Indeed, the IEDs are far from being fully *Shariah*-compliant; many violations of the contractual rules were reported while analyzing those products. At first glance, we can see that IEDs are mainly based on contracts' combination and conditioning and a multitude of sales for the sake of form. On the other hand, the binding promise plays a central role in structuring those products. The difference between conventional and IEDs becomes superficial when the binding promise is used to structure them. The binding promise leads to a ZSG with uncertain payoffs and could result in disputes and eating others' wealth, which are all characteristics of *gharar* transactions (Al-Suwailem, 2000).

Financial innovation and engineering can be viewed as a reaction to some restrictions to economic objectives such as profit, liquidity and risk reduction (Al-Suwailem, 2004). The central impulses to successful financial innovations have come from the desire to override regulations and taxes (Miller, 1986). For the IFE, a third motivation is to consider; circumventing the *Shariah* restrictions. According to Al-Sabhany (2019), the IFE was mainly motivated by the search of bypassing *Shariah* prohibitions on financial transactions, which explains its current "negative" path. Bypassing *Shariah* prohibitions becomes, because of the current path of the IF industry (i.e., short-termism and rent-seeking), undoubtedly a motivation of the IFE. In practice, with the dominance of imitation strategy, the conceptual side of IFE that is embodied in its principles is, to a large extent, neglected. Consequently, the failure of IEDs to be fully *Shariah*-compliant is not surprising.

It is essential to keep in mind that risk management is crucial for both the qualitative and quantitative development of the IF industry. Nevertheless, the pressing need for risk management instruments should not let the IFE move from its vital role to be a destructive element for the IF through circumventing *Shariah* rules. Thus, the IFE is presently at a crossroads. The right direction is by giving due consideration not only to the literal structure of products and processes but also to their consequences for the future of the IF industry (DeLorenzo, 2007). This may seem a difficult task but not, in any way, an impossible one. In fact, contrary to common belief, the IF provides the basic blocks that can be used to build more complex financial instruments that will improve liquidity and provide risk management tools (Iqbal, 1999). With the availability of building blocks, mutuality will carry out the task. In practice, the instruments of IF may all become PLS instruments, even if they are not by nature, by reengineering through mutual arrangements (Kafou and Chakir, 2015). The recourse to mutuality was already proposed, by several authors, as a solution for risk management. In fact, through mutual arrangements, Al-Suwailem (2006) suggested some solutions to hedge the mark-up risks while Kafou and Chakir (2015) pioneered a hedging strategy for the commodity risk. In turn, Mansour *et al.* (2015) designed a new structure that permits dealing with cash flows variability within the PLS financing modes. In sum, the imitation strategy is not inevitable, and it is possible to do without within the mutuality framework. The transition towards mutuality is compulsory for the IF to keep its distinguishing features and for the IFE to design products that offer a conceptual alternative to the conventional ones.

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Evaluating *Sukuk* Default Factors: A Case Study on Dana Gas *Sukuk* in the UAE

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Abstract

In the last couple of years, the Islamic finance industry was rocked by several *sukuk* defaults, the most prominent among them being Dana Gas *Sukuk*. These defaults led to hordes of questions related to *Shariah* governance, unstandardized legal documentation, *Shariah* non-compliant structure, lack of intent and transparency, incongruence in governing laws, and a lack of regulatory support. This paper assesses Dana Gas *Sukuk* by conducting a qualitative analysis to determine the circumstances that led to the failures of this *sukuk*. Using secondary sources this paper employs a content analysis method and scrutinizes the *sukuk* understudy with a special focus on its structure, governance mechanism, and legal jurisdiction. Thus, the study suggests standardizing the legal documentation and *Shariah* interpretation of the Islamic capital market, as it would reduce the risk of *Shariah* non-compliance and remove all the uncertainty and ambiguities and would help to avoid such *sukuk* default. Finally, it can be asserted that an attempt is made to offer some recommendations that hopefully will avert similar defaults in the future and help the Islamic finance industry to achieve greater standardization and clarity.

Keywords: *sukuk, Shariah governance, Shariah non-compliant, governing laws, legal documentation*

1. Introduction

The global *sukuk* players are actively participating in the issuance of *sukuk* and many Islamic countries and corporates as well as western countries like the UK, Hong Kong, South Africa, and other affiliated corporates like Goldman Sachs have successfully debuted in the Islamic capital markets. As per the International Islamic Financial Market (IIFM) *Sukuk* Report (2021) Global *sukuk* issuance has expanded by 19.84 percent or USD 145.702 billion in 2019 to USD 174.641 billion in 2020. This implies that short-term issuances rose by almost 44.50 percent whereas long-term issuances expanded by about 12%. New *sukuk* issuances from Power Holding Public Limited Pakistan, Oman Sovereign Sukuk, ICDPS Sukuk Limited and others provided the market prodigious impetus in 2020 (IIFM, 2021).

However, repercussions and shockwaves have rocked the Islamic finance industry in the past decades, latest being when Dana Gas declared its *mudarabah sukuk* as *Shariah* non-compliant instrument asserting that "Due to the evolution and continual development of Islamic financial instruments and their interpretation, the company has recently received legal advice that the *sukuk* in its present form is not Shariah-compliant and is therefore unlawful under the UAE law. As a result, a restructuring of the current *sukuk* is necessary to ensure that it conforms to the relevant laws for the benefit of all stakeholders" (Dana Gas, 2017). To rub salt in the wound, Dana Gas declined to repay the overdue coupons once claimed by the investors and Deutsche Bank AG, the *Sukuk*'s Principal Paying and Exchange Agent. Dana Gas went even further, by declaring that the prior profit payouts should be restored to them due to the invalidity of *sukuk* (Hekmatyar, 2018).

Hence, the aim of this research is to evaluate the issuance of Dana Gas Sukuk in the United Arab Emirates and, afterward, qualitatively analyze to find the factors that caused the default of this *sukuk* issuance. The research tends to focus on the legal framework of *sukuk* market of United Arab Emirates only as the financial

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market of this jurisdiction is predominant and mature. The study differs from the past studies on Dana Gas Sukuk in the sense that it encompasses the regulatory challenges of both jurisdictions and highlights the reasons of failure of this peculiar *sukuk*. Nevertheless, the study is significant as it will contribute to the body of knowledge and aims to recommend some strategies and procedures to avoid such default and repercussions to the Islamic capital market. Similarly, the research would also assist the Islamic banking and finance community to understand the nature, structure, and governance framework of Islamic capital market of this jurisdiction. Therefore, the evaluation of such a case shall fulfil the gap and enable the *sukuk* market to evolve further and become more resilient for similar future occurrences.

2. Literature Review

2.1 Definition of Sukuk

Sukuk is a Shariah-compliant substitute to a traditional bond and has witnessed tremendous development in the last few decades and it is demonstrating a bright future ahead. The Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI) describes *sukuk* as: "… certificates of equal value representing, after closing subscription, receipt of the value of the certificates and putting it to use as planned, common title to shares and rights in tangible assets, usufructs and services, or equity of a given project or equity of a special investment activity" (AAOIFI, 2017).

In a simple sense, *sukuk* are documents or certificates that indicate the holding of an asset. It confers shareholders a portion of the asset, as well as the profits and potential risks accompanying from such investment. The structure of *sukuk* can be relied on the tenets of exchange contracts such as "*ijarah, murabahah, istisna*' and partnership contracts (e.g., "*musharakah* and *murabahah*") (Yean, 2009).

In the same context, the Islamic Financial Services Board (IFSB) describes *sukuk* as follows:

"*Sukuk* (plural of *sakk*), frequently referred to as Islamic Bonds, are certificates each of which represents the holder's proportional undivided ownership right in tangible assets, or pool of predominantly tangible assets, or a business venture."

2.2 Sukuk Development

As early as 1978, efforts to introduce a *Shariah* compliant bond-like security were undertaken by Jordan, whereupon the government authorized Islamic bank of Jordan to launch *muqaradah* bonds. As a result, the *muqaradah* bond Act was enacted in 1981. Similarly, in Pakistan, a peculiar law termed as the "*mudarabah* flotation and control ordinance of 1980" was enacted. Notwithstanding, either of these initiatives has yielded any notable results.

The Malaysian government was the first to successfully incorporate Islamic bonds in 1983, with the introduction of "Government Investment Issues" (GII) - originally named as "Government Investment Certificates" (GIC). Due to the sluggish pace of development the IFIs were unable to build an active market for such instruments. Furthermore, the development of an asset securitization in traditional markets has established a paradigm that could be applied to Islamic assets as well. It was not until the late 1990s when Bahrain and Malaysia have introduced a well-versed framework of an asset-backed security in the shape of *sukuk*. This structure attracted the attention of investors and borrowers and was deemed a prospective tool to evolve Islamic capital markets (Iqbal, 2011). However, The Gulf countries did not step into the capital markets up until 2016, when oil prices had fallen to less than US$50 per barrel. It was then when Abu Dhabi came back to the bond markets after 9 years to offset a US$10mn deficit. The results were staggering; the order book was oversubscribed by more than three times for a US$5mn bond. This success was noted and carried on by Saudi government when they issued a US$9bn *sukuk* in 2017. The Gulf council realized if they wanted to diversify their economies, capital markets are the key. The global *sukuk* players are accumulating with good pace and many Islamic countries and corporates as well as western countries like the UK, Hong Kong, South Africa and other affiliated corporates like Goldman Sachs have successfully debuted in the Islamic capital markets. Despite the Middle East's sociopolitical instability, Arab nations have maintained their *sukuk* pace; Saudi Arabia leads, followed by Qatar, Bahrain, and the United Arab Emirates. They mostly concentrated on the Eurobond market, apart from Bahrain, which has a thriving local *sukuk* market. The Gulf is a US Dollar economy, although they have their local currency, it is pegged to the US dollar (Drum, 2021). The majorities are issued in US dollar and are listed in London Stock Exchange being home to most of the listed international *sukuk*. In addition, the number of *sukuk* issuers and industry players seems not to be influenced by the recent *sukuk* default cases nor has it affected the confidence of local and global investors, notably Dana gas, Investment Dar Sukuk from Kuwait, and the Golden Belt from Saudi.

2.2.1 Types of offerings

Generally, there are three levels at which capital market offering may be made in a country, though of course, different jurisdictions have different rules. The three broad levels of offering distribution are:

a) Exempt offering: The offering is not approved by the regulatory authority, but the regulator instead exempted the need for an approval subject to certain conditions. In this case, the regulator may restrict the marketing of the offering to a very limited number of qualifying (institutional) investors only.
b) Private placement: The offering is approved for restricted marketing. This could carry the advantages of lower disclosure requirements, no listing requirement, shorter time to gain approval and lower costs, but the disadvantage is that the offering would only be marketed to a limited number of qualifying (institutional) investors.
c) Public offering: The offering is approved for unrestricted marketing to and subscription by the public. Typically, this would be for high quality offering by well-established entities. There would be an onerous disclosure obligation, a listing requirement, a longer approval timeline, greater public security (e.g., on *sukuk* structure), higher legal costs (legal due diligence may be required) and higher marketing costs.

2.3 Developing Capital Markets

Developing capital markets is a long-term project. The traditional capital markets of today are the result of years of adaptation, which has enabled them to cope with the remarkable rate of innovation seen in recent decades. Islamic capital markets may learn from and benefit from the conventional markets' extensive expertise to accelerate their own development. Today's capital markets are part of a complex system that includes various components such as the status of the regulatory regime, the quality of supporting institutions, the design of incentive and corporate-governance systems, as well as market microstructure and behaviors. Other elements that influence the formation of an efficient capital market include the market's breadth, which is defined by the product variety, the availability of credible performance standards, market participant culture, and the degree of interaction with external markets. The primary obstacles to the establishment of Islamic capital markets are explored in the next section.

Many Muslim developing countries, like many of their non-Muslim counterparts, are heavily in debt. Only the six Gulf Cooperation Council nations have positive budgetary balances among the 57 OIC countries. The remaining 51 OIC countries have budget deficits. The World Bank/IMF classifies 19 of these 51 nations as Heavily Indebted Poor Countries (HIPCs). The fact that government spending outnumbers government receipts is a frequent feature of emerging economies. It usually arises because of a need to support development. As things stand today, there are two major issues with this. First, the budget deficit is usually filled via interest-based borrowing. Second, governments must borrow in foreign currency because domestic capital accumulation is typically insufficient. Even if the borrowing is done through the issuing of bonds, the bonds must be denominated in foreign currency to minimize necessary yields. Two things happen because of such compulsion. As a result, the economy becomes leveraged and exposed to exchange rate risk, making it sensitive to such dangers.

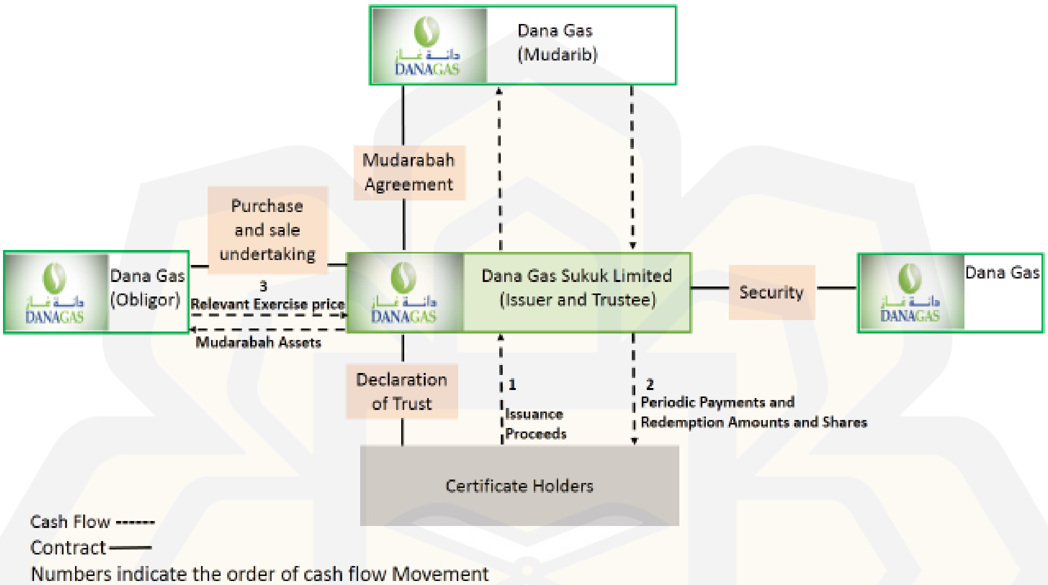
2.4 Dana Gas Sukuk

The original issuance issued in 2007 was about to be restructured at the Sharjah headquartered Dana Gas Sukuk Ltd on May 8th, 2013, when their shareholders approved of restructuring the already issued US$1bn *sukuk* and decided to re-issue a dual tranche *sukuk* amounting to US$850mn maturing in 2017. It was riskier back in the day as the share price of the company was already down by 59 fills (16.06 Us Cents) (Islamic Finance News, 2018). One could say that Dana Gas did not want to dilute the equity ownership, hence they defaulted, but back on this at a later stage. The tranches were split into two, a US$450mn ordinary *sukuk* and a US$450mn convertible *sukuk* at 7% and 9% respectively. The certificates were traded on the Irish Stock exchange, while the arrangers were “JP Morgan Securities Ltd., Citigroup Global Markets Limited and Barclays Bank plc (the 'Joint Lead Managers')” accompanied by the Deutsche Trustee Company Limited as a delegate.

2.4.1 Structure of Dana Gas Sukuk

The Figure below illustrates the structure and contractual relationships between the contracting parties of Dana Gas Sukuk. As it is obvious that only Dana Gas[1] (SPV) is involved in this transaction where it is acting as an Issuer, Trustee, Purchaser, *Mudarib* (entrepreneur) and Obligor. It can be realized in the following figure (Figure 1):

Figure 1: Modus operandi of Dana Gas Sukuk.



Source: (Author, 2020)

Cash flow of the structure:

1. Investors fund the trustee and issued *sukuk*.
2. The trustee then gets into a *mudarabah* contract with the *mudarib* (entrepreneur) to manage the residual capital and also to invest in *Shariah* compliant products as per the investment plan laid out. The *mudarib* (entrepreneur) consented to manage a ledger account as the "Reserve Account" in its books, designated in U.S. dollars.
3. The obligor acquired the Trustee's rights, advantages, and entitlements to the *mudarabah* assets in the requisite fraction from the Trustee on "as is" basis at the related exercise price, following the Trustee's delivery of a notice under the Purchase Undertaking (the "Exercise Notice") on the terms and subject to the conditions of the Purchase Undertaking.

Hence, it can be stated that on October 31, 2007, the Trustee and Dana Gas ("in its capacity as *mudarib*") (entrepreneur) signed a *mudarabah* contract (the "Original *mudarabah* Agreement") in which the *mudarib* (entrepreneur) invested US$1,000,000,000 (the "Initial *Mudarabah* Capital") in definite *mudarabah* assets (the "Initial *Mudarabah* Assets") in consistent with an investment scheme laid down in the original *mudarabah* contract. On the due date, the *mudarib* (entrepreneur) delivered 14.992 per cent of the primary *Mudarabah* Funds (indicating US$149,920,000 of the initial *Mudarabah* Assets) to Dana Gas (in its independent capacity), and the Trustee and the *mudarib* (entrepreneur) consented to modify and reaffirm the initial *mudarabah* contract. Dana Gas employed 100 percent of the revenues to maintain the residual balance of the initial *mudarabah* capital, which reflected the residual balance of the Initial *Mudarabah* Capital at the due date, which

[1] Dana Gas PJSC is a publicly traded natural gas company, based in Sharjah, United Arab Emirates. Incorporated and listed on the Abu Dhabi Securities Exchange in 2005.

was US$850,080,000, in line with the aspects of the *mudarabah* contract an investment strategy that allows specific investments to be initiated in a handful of *Shariah* compliance undertakings, namely (without restriction) some investments in Dana Gas's commercial operations.

2.5 Verdict from the English High Court

The Purchase Undertaking (governed by English Law) which lays out Dana Gas's payment rights within the *sukuk*, was found to be legal and binding in line with its provisions, and Dana Gas was ordered to make the requisite payments to its creditors who acquired the *sukuk*.

The English High court held:

1. As stated, the disbursement of exercise price within the "Purchase Undertaking" was not contingent on the delivery of assets under UAE law regulated instruments, and the execution and transfer were aimed to be sequential rather than contemporaneous procedures.
2. The notion of misunderstanding will only arise if the contract had a gap in it. There would have been no shortfall in the agreement if the parties had explicitly or impliedly consented on the occurrence of some specific incidences, and the concept of misunderstanding will not arise in those scenarios. In this case, the counterparties had explicitly acknowledged that the illegality and invalidation of the "*Mudarabah* Agreement and Sale Agreement" would lead to the dissolution of *sukuk,* and as consequence, the *Sukuk* Trustee would have the power to release an exercise statement triggering the "Purchase Undertaking". Dana Gas would be obligated to reimburse the "Exercise Price" for the *sukuk* when the exercise notification is released under the provisions of the "Purchase Undertaking". Since the provisions *sukuk* explicitly cater for a circumstance in which the existence and enforcement of "*Mudarabah* Agreement and Sale Agreement" are being questioned, since there is no gap in the contract, the English High Court resolved that the notion of misunderstanding would not apply in this case.
3. In this *sukuk* structure, under the "Purchase Undertaking" England was the jurisdiction to execute the payment responsibilities, because the accounts for the *sukuk* transactions were maintained by the "*Sukuk* Trustee with Deutsche Bank in London". Therefore, the High Court declared that while determining the applicability of the "Purchase Undertaking under English law", it did not need to consider any prevailing requisite provisions of the UAE law (Trowers & Hamlins, 2018).

2.6 Sharjah High Court rulings

Since the legality of the contract was non-exclusive jurisdiction of the English courts. In December 2017, the Sharjah court agreed to Dana Gas's appeal to participate in the UK high courts proceedings on the defaulted *sukuk*. The decision is basically an appeal against the English court's rulings that *sukuk* issuance is valid under English law. Two months post the appeal when the English court again overruled Dana Gas's attempt to overturn the decision, Sharjah Court of First instance orders the Gas company to suspend the enforcement in the UAE of judgments issued by the English court of justice. It ordered to refer all the UK judgments to the UAE courts for the determination of their eligibility of enforcement in the country and orders to continue proceedings and submit all defenses.

In May 2018, with the expectations to resolve the legal challenges in the UK and the UAE, a delegation was set up to represent the securities owners, comprising BlackRock Inc. and Goldman Sachs Group Inc., to discuss a new agreement with Dana Gas. It is reported that the committee has consented to reform the *sukuk* structure, giving the creditors two choices: (1) withdraw the *sukuk* at 90.5 US cents per dollar of face value, or (2) rollover the present *sukuk* into a new three-years *sukuk* with a yield of 4% annually and finally in 2018 August Dana Gas ended all the litigations in UK and UAE (Trowers & Hamlins, 2018). The corporation saved US$21 million by purchasing back US$133 million of its *sukuk* in the marketplace at a discount and by saving future profit rates on *sukuk* that was purchased back. Dana Gas saves an additional of US$8 million by retaining the profit rate at 4% per annum, boosting the overall savings to US$29 million, in contrast, to one year saving of US$35 million saved "at the time of the restructuring" (Khan, 2019).

2.7 Reasons for default

As stated below, the causes of default are split into the internal causes and external causes.

2.7.1 Internal causes

- It is vital that the *sukuk* structure of Dana Gas is centered on the law of UAE. Whereas the English law regulates the “Purchase Undertaking Agreement”. As the agreement implies that following the investment plan the funds received by the trustee should be invested by Dana Gas Limited. According to the Dana Gas agreement, the revenue earned by *mudarabah* assets will be distributed periodically between Dana Gas PJSC (*mudarib*) (entrepreneur) and the trustee (*rab-al-mal*) in a ratio of 99 percent to 1 percent. Nevertheless, assuring a confirmed profit in a *mudarabah sukuk* to any of the contracting parties is a breach of Shariah principle. As a result, the method of purchase undertaking employed was inconsistent with Shariah standards (Busari, 2019).
- It is investigated that the mechanism of dividend payout of Dana Gas Sukuk was imitating to some extent to the traditional bond output, contradicting to the standards of AAOIFI and UAE (Hekmatyar, 2018).

2.7.2 External causes

- It is cited that the liquidity constraints induced by late payments from Egypt and Iraq's Kurdistan provinces was one of the causes for Dana Gas Sukuk default (“UAE's Dana Gas Misses”, 2012). Whereupon 729 million dirhams were remained unpaid from Egypt gas supplies and 1.2 billion dirhams in the Kurdistan province (“UAE's Dana Gas won’t”, 2012).
- Finally, it can be asserted that the absence of an effective regulatory framework from both a legal and *Shariah* aspects have led to this instability. Since then, the UAE has a fragmented Shariah compliance structure in place for Islamic finance industry. Article 6 of the UAE Islamic banking law declares “that each Islamic Bank (IB), financial institution and Investment Company should establish its own Shariah Supervisory Authority to ensure that its transactions and practices conform to Islamic law. It also states the establishment of Higher Shariah Authority to supervise Islamic Banks, financial institutions and investment companies”. Art. 5, Federal Law No. 6 of 1985. (Hamza, 2013). In fact, the Higher Shariah Authority was not in place by that time, and Shariah Supervisory Boards (SSBs) are undertaking the obligation of *Shariah* governance (Hamid, 2015). Similarly, the governing laws and jurisdictions are primarily split amongst English and UAE law. “The Declaration of Trust, the Agency Agreement, the Purchase Undertaking, the Sale Undertaking, the Security Agreement, the Security Agency Agreement, the Ordinary Certificates and the Exchangeable Certificates are governed by English law and subject to the non-exclusive jurisdiction of the English Courts. Whereas the *Mudarabah* Agreement, the UAE Share Pledges and the UAE Mortgage were governed by the laws of the UAE” (Hekmatyar, 2018).

3. Research Methodology

To accomplish the objectives of this research the study applies a qualitative method by using the library research and content analysis approach. From the library research, the study employs comparative and content analysis methods. In this essence, the secondary data was collected through different sources like, English law, the law of UAE, verdicts of English court, articles, books, websites, and academic writings and then compare and analyze them using analytical methods. The research analyzes the issuance of Dana Gas Sukuk in UAE to discover the factors that caused the default of this *sukuk*. Furthermore, the research also tries to urge the IFIs practitioners and academicians to comprehend the nature, structure, and governance framework of Islamic capital market of this jurisdiction (Mohtesham, 2021; Hai, 2021).

4. Finding and Discussion

There were many repercussions and shockwaves around the Islamic finance industry, since then, most *sukuk* issuance come with warranties to prevent obligors from declaring non-*Shariah* compliance. As the case with any default, if standardization of Islamic products would have been in place, we would not be seeing this day. Where standardized *Shariah* interpretations would eliminate the likelihood of someone arguing that something is not *Shariah* compliant, and this would help to prevent such dilemmas in the first place.

Furthermore, to remove the uncertainty and ambiguity the market urgently requires standardized legal documentation. As Dr. Mohamed Damak, the global head of Islamic finance at S&P Global Ratings asserts that this would make the rating agencies life easier in rating *sukuk*. The intricacy of mixing English law and local law for the *Shariah* products at times creates conflict as is seen in the Dana Gas. Further, the UAE has a decentralized version for *Shariah* compliance matters in Islamic finance industry. Article 6 of the UAE Islamic banking law declares "that each Islamic Bank (IB), financial institution and Investment Company should establish its own Shariah Supervisory Authority to ensure that its transactions and practices conform to Islamic law. It also states the establishment of Higher Shariah Authority to supervise Islamic banks, financial institutions and investment companies". Art. 5, Federal Law No. 6 of 1985 (Hekmatyar, 2018; Hamza, 2013). Hence, this form of decentralized version for Shariah compliance matters in Islamic finance industry may cause to many repercussions in the industry and hinder the growth of IFIs across the globe.

5. Conclusion and Recommendation

Based on the above deliberation the study aims to recommend some strategies and procedures to avoid such defaults and repercussions to the Islamic finance industry. Thus, the study aims to make the following recommendations:

1. The study finds that there is dire need to standardize the *Shariah* interpretation of *sukuk* structures used in the Islamic capital market. As the standardized *Shariah* interpretation would reduce the risk of non- Shariah compliance and would help to avoid *sukuk* defaults. Moreover, to eliminate the suspension and ambiguity, the market imminently requires standardized legal documentation. Thus, the likelihood of standardizing the *Shariah* interpretation and legal documentation can be accomplished by the *Shariah* scholar's and legal council's considerable collective efforts of the region. The role of AAOIFI in this recommendation would be vital, as the AAOIFI *Shariah* standards on *sukuk* will provide a comprehensive guidance to the UAE's ICM.
2. Decentralized version of *Shariah* compliance matters in Islamic finance industry may cause many issues and hinder the growth of IFIs in the region. Thus, seminars, forums and round table discussions should be held amongst the *Shariah* scholars of the region to centralize the *Shariah* compliant matters and harmonize the *Shariah* rulings of Islamic finance industry. Since seminars and forums will enhance the understanding of *Shariah* scholars with regards to the development, and regulatory requirements of Islamic capital market of the province. These efficient platforms will assist in identifying the rulings that can be centralize in the UAE.
3. The study also suggests that the regulators should reshape their organizations and practices in ways that explicitly and effectively safeguard transparency throughout the *sukuk* insolvency process and protect equally all creditors' rights in cross-border insolvencies. Without these legislative initiatives, jurisdictions would inevitably see that the confidence of foreign investor is eroded further, which in time will slow the modernization of their economies and jeopardize long-term growth. The study further suggests that a detailed review needs to be done by the regulator with regards to the *sukuk* legal framework and the local regulatory requirements as in most cases *sukuk* documents in relation to sale and purchase of assets of the underlying *sukuk* assets are governed of the local laws and the overall *sukuk* documentation is governed by the English law.
4. As far as the process of documentation is concerned the research highlights the need for care by banks and their lawyers to ensure that offering documentation fully describes the scope of the role that the institution agrees to perform in the transaction and the need to draft disclaimers to encompass acts and omissions in carrying out all the constituent elements of that role.
5. Finally, default in a financing structure is not new to any financial industry but at times what gets disappointing is the wrong expectation from the parties regarding a financial structure. The challenge of structuring a *sukuk* is quite evident that from credit perspective it needs to behave

like a debt instrument irrespective even though if it is structured in an equity or profit-sharing format. In this *sukuk* default also a message was quite clear and that is even though it was a *mudarabah sukuk* and there was a genuine market condition in the form of financial crisis still the payment obligation of the partner (i.e., the client) was enforced. Few industry participants consider this to be an act of misrepresentation, but the fact of the matter is all the parties including the investors are made aware of their rights, obligations, and risk in the *sukuk*. This approach is taken not to misrepresent but under the current challenge of finding a suitable *sukuk* structure because at times the client does not have enough assets to match the issuance size of the *sukuk* and in such scenarios a *mudarabah* avenue is ventured into. The study here suggests that sufficient assets need to be identified and an easy access should be provided to *sukuk* issuers so that they can have smooth issuance of *sukuk*.

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A Distributionally AI Robust Islamic Portfolio Approach-A Case Study of The Impact of Sanctions on The Incorporation of Chinese Stocks into Islamic ETF

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Abstract

Sanctions have long been utilized as a form of forcing the sanctioned countries and entities to change their course and conform to the objectives of the sanction imposing country or entity. Sanctions have been primarily used for trade embargoes and restrictions on the types of goods and services that can be exported from a specific country. Financial sanctions have been instituted primarily in the last century, given the growing importance of the international financial system and interconnection between countries. Furthermore, the role of the US Dollar as the international reserve currency, combined with its extraterritorial legal aspect and the prevalence of US institutions to facilitate cross-border transfers, has made financial sanctions an attractive tool of international coercive action. While the effectiveness of financial sanctions is debatable, they have still been attractive for many nations to be employed. The United States and China have experienced considerable disagreements with respect to their view on trade terms and the exchange of information. This has led to the sanctioning of several businesses by the United States and even forced some corporations to delist from US exchanges. For investors, this poses a significant risk as corporations may be required to delist, which will lead to significant losses. We present a distributionally robust optimization framework for the optimal Islamic portfolio when taking into account the risk of sanctions. The key feature of the framework is that it both integrates Islamic values in addition to ensuring robustness against the impact of possible sanctions. The results demonstrated that the investments are within a limited number of enterprises in order to avoid potential significant downside risks related to sanctions. The framework and study represent an important step towards greater risk assessment of sanctions-related effects on *Shariah*-compliant portfolios and safeguarding the returns of Islamic ETF investors. This contributes significantly to maintaining *Shariah* principles that focus on value investment and reduce the risk of fund managers engaging in gambling risks to drive returns.

Keywords: *Islamic finance, economic sanctions, distributionally robust optimization, Islamic law, robust portfolio*

1. Introduction

Economic sanctions have become a major constituent of the international financial system with several major countries imposing sanctions in order to achieve political or economic objectives (Jazairy, 2019). Such sanctions are commercial or financial penalties and aim to challenge the ability of an economy or entity to conduct business within an international environment. The topic of imposing sanctions is a contentious one in international law. The state sovereignty principle under the UN Charter suggests that the sovereign state system internationally accepts that it is a horizontal system that considers all sovereign states as equal. Article 2(7) of the U.N. Charter restricts any U.N. intervention in "matters which are essentially within the domestic jurisdiction of any state." This forms the international law principle of 'non-intervention' that prohibits states from intervening in the sovereign affairs of any other state. Effectively the principle translates that, 'any state

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may not adopt policies or engage in conduct that effectively coerces other states to change or modify their choices regarding socio-economic systems or their domestic or foreign policy.'

Recent events in Ukraine have led many countries in Europe and North America to impose sanctions on Russia, specifically focusing on certain entities and individuals that are sanctioned. Sanctions have a long history and were highly prominent during World War 1 when the League of Nations permitted the use of sanctions for five different cases. The form in which sanctions are applied may differ widely based on the different countries and entities involved (Peksen, 2019). Early sanctions were mostly in the form of embargoes where the imposing entity forbade the trading of certain goods. This was in most instances connected to natural resources, such as oil, and was displayed in the Embargo Act of 1807, where the focus was on maintaining neutrality between the UK and France and ensuring that the US trading relationship with each of the nations was not affected by these nations (Drezner, 2019). The Act was, in general, ineffective and was repealed afterward.

An important question from these different forms of sanction is the effect they have on the target countries and what overall effect there is on specific sectors. A general study outlined that, economic sanctions have a significant impact on the GDP growth rate, decreasing by an average of 3 percentage points a year (Neuenkirch and Neumeier, 2015). The effects may be significant and can last up to 10 years, which may reduce the target country's GDP per capita by more than 25 percent within these years. A key aspect is that the imposing country is conventionally also affected by the sanctions imposed, specifically when there are import or export restrictions applied. For example, for import restrictions, the consumers may experience a limitation in goods and services, while in the case of export restrictions, the imposing country and businesses may lose market and investment opportunities (Early and Peksen, 2019).

While there are various reasons for the imposition of economic sanctions, the fostering of regime change is one of the major objectives. While this may not necessarily be rather effective, with estimates for the success ranging from 4 to 34 percent, the main reason is the popularity of such measures and the lack of alternatives besides military actions or words. However, sanctions may not be rather effective given that most of the sanctioned countries are led by non-democratic regimes whose response to popular will is rather minimal (Early and Peksen, 2019).

2. Literature Review

Economic sanctions represent significant challenges for fund managers in the financial industry as they may affect their ability to invest in certain corporations or be active in certain markets. The associated risk that is connected with the imposition of sanctions is especially significant in portfolio management, where investment durations are over several years in which government sanctions may change rather abruptly (Korotin *et al.*, 2019).

For Islamic compliant fund options, economic sanctions may make it rather challenging to have access to the financial system infrastructure in order to access the financial markets. Specifically, many economic sanctions may either restrict investment into sectors that may be considered sensitive, or banks are sanctioned to not provide any transactions with the sanctioned entities. While most Islamic funds have been set up in a variety of different countries, many of these have connections to the capital markets in the United States or are conducting transactions that interact with financial institutions in the United States. Given the size and accessibility of the major US stock markets, this makes these markets very attractive and readily accessible to many institutional and retail investors (Samadi *et al.*, 2021).

China has in the last several decades become a major economic powerhouse, multiplying its GDP within the last 20 years by multiple folds and becoming the second-largest economy in the world by the 2010s. With increasing economic growth, the investment in Chinese corporations has become of increasing interest for many investors that want to participate in its growth. Additionally, the Chinese market has become increasingly more accessible, with Chinese regulations permitting investment in the Chinese stock market. Investors interested in *Shariah*-compliant financing options for Chinese equities have encountered increasing accessibility by both *Shariah*-compliant funds and individual investors (Froese *et al.*, 2019).

Given the increasing rivalry between the United States and China, there were several economic sanctions instituted between the two countries that affected the economy of both countries. While previous economic sanctions primarily focused on arms and military infrastructure sanctions, the last several years have led to considerable broader sanctions being imposed, such as the banning of Huawei and ZTE from US federal governments contracts and imposing export restrictions on Chinese entities (Jaisal, 2020). Specifically, Huawei was restricted from utilizing US originating technologies that are subject to licensing requirements. This has literally made it impossible for Huawei to continue to use the Android operating system due to the fact that it is provisioned by Google, which is an American entity. Another major sanction is executive order 13959 which forbids all US investors from purchasing or investing into securities that are classified as companies that support the Chinese military (Robinson, 2020).

Likewise, Chinese regulators have significantly increased their regulations for Chinese corporations that are doing business or list overseas. One of the most recent examples was the IPO of Didi ride hailing that immediately drew the attention of the regulators that warned the company not to list before a cybersecurity assessment was to complete. The company went public without the consent of the Chinese government, and then was subject to a data protection inquiry based on the Data Security Law. The data security law was passed on June 10th, 2021 by China's Standing Committee of the National People's Congress and seeks to strengthen regulations on data collection, storage and distribution within its digital economy (Parasol, 2018). This was primarily due to the fact that Didi collects significant amount of data of Chinese users that are the telephone number, user information and payment profiles as well as identification information. Specifically, in the case of an IPO these data have to be handed over to the Security Exchange Commission for audits if these are requested. Recent scandals, such as those of LuckinCoffee, have increased associated concerns with Chinese IPOs and stocks listed abroad and the challenges with data transparency (Peng *et al.*, 2022). Furthermore, there have been recent discrepancies between the US and Chinese authorities in the permission of providing audit data of Chinese corporations listed in the United States, and investing into foreign companies, in addition to US investors being allowed to invest in corporations in China.

Given the growing challenges between the two nations, investors need to take into account the associated risks of sanctions and regulations affecting their ability to invest into corporations within both China and the United States.

3. Conceptual Framework

Robust optimization has been widely utilized in practical application, where most often it is assumed that the distribution of the uncertain data set is known. While this allows to utilize robust optimization approaches efficiently and determine a data confidence region with respect to bounded support, it disregards the distributional information when determining the worst-case scenario. Most individuals resort to stochastic programming that incorporates all distributional information but optimizes the expected values in contrast to robust optimization that aims to focus on the worst-case value (Gabrel *et al.*, 2014).

The challenge with these both approaches is that the distribution is in practical applications only approximated and needs to be estimated from the observed data auxiliary assumptions. Likewise, this may introduce errors that arise from the assumption of the specific distribution. When considering the impact of sanctions on the performance of stocks, then such an approach may be easily considered to be rather biased given the lack of knowledge of the impact. These challenges the probabilistic guarantees provided by robust optimization, and also reduces the appeal of objective functions based on the expectation. Therefore, both the data uncertainty and estimation uncertainty should be taken into account in the optimization routine in order to capture accurately the beliefs about the data (Quaranta and Zaffaroni, 2008).

Distributionally robust optimization is based on the approach established by Scarf in 1958 to tackle the newsvendor problem. This implies that the author aimed to solve a stochastic program where robust optimization is applied to the estimation of the distribution information. The objective function is evaluated based on the expected value of random data but a worst-case distribution is applied (Bertsimas *et al.*, 2019). This implies that the distribution itself is uncertain and contained within an ambiguity set, which allows to model the conservatism of the assumptions in the distribution. If the ambiguity set only contains a single distribution, then the optimization result transforms into a stochastic program. Likewise, if the ambiguity set contains all the distributions and its support, then a robust optimization problem is solved. In many instances, the ambiguity set is a set of scalar distributions that have a known mean and variance such as to maximize the worst-case expectation within a piecewise linear function. Various other ambiguity sets have been defined and investigated, and in order to solve there are two major solution approaches. The first relates to cutting-plane methods, which solve a finite inner approximation in series in terms of the ambiguity set. The second method is focusing on solving a finite representation of the finite problem (Wiesemann *et al.*, 2014).

In order to apply the distributionally robust optimization approach to the optimization of a portfolio consisting of US and Chinese *Shariah* compliant stocks, the worst-case expected utility is maximized. The optimization problem is then transformed into:

$$\max_{x} \inf_{\rho\in\Gamma} E_{\rho}\left(U\left(\sum_{i=1}^{n} d_i x_i\right)\right)$$
$$\text{s.t.} \sum_{i=1}^{n} x_i = 1$$
$$x_i \in \mathbb{R}_+, \forall i = 1, \cdots, n$$

With the assumption of the utility function being piecewise affine and concave, the problem can be transformed into an adaptive problem readily solvable with distributionally robust optimization frameworks such as RSOME (Chen *et al.*, 2020).

4. Research Methodology

The framework was evaluated on a dataset consisting of the constituents of the MSCI USA Islamic ETF that is one of the premier *Shariah* compliant ETFs for the investment in US equities (BlackRock, 2022). The index fund experienced a return of more than 67 percent in the last five years, and represents single-country exposures with all constituents being compliant with *Shariah* principles. The largest constituents of the fund by March 31st, 2022 were Johnson & Johnson, Procter & Gamble and Exxon Mobil corporation, which are all large multinational corporations in various sectors.

The corporations in China are the second batch and based on the MSCI China A ETF, which was filtered according to the constituents that are violating *Shariah* principles (BlackRock, 2022). The Chinese A-share stock market was largely inaccessible to international investors in the past, but recent greater openness enables large institutional investors to invest directly within the market. While several corporations are listed in the United States, risks of delisting as well as non-direct investment into these corporations makes this rather uncertain to link these corporations to the real value of the assets. Specifically, in the context of Islamic Law, this may lead to the view that these stocks are more of speculative form rather than representing their real value. When it comes to Islamic principles, several stocks are automatically removed from the analysis, such as Kweichow Moutai Ltd A, which is a producer of alcohol. On the other hand, the second largest constituent of the fund, Contemporary Amperex Technology Ltd is one of the largest manufacturers of lithium batteries, and a key player in the energy transition and move towards battery systems. These principles are used to manually filter out any corporations that due to their business do not adhere to Islamic principles (Hasan *et al.*, 2020). The remaining corporations are then analyzed according to various financial performance parameters.

5. Results and Discussion

The key objective was to determine the differences between *Shariah* compliant US corporations and their Chinese counterparts.

Figure 1 compares the debt to equity, price to book and revenue growth for the various corporations. The comparison indicates that Chinese corporations are significantly higher leveraged as compared to their *Shariah* compliant US counterparts. Specifically, the debt-to-equity ratio versus the price to book ratio is considerably higher for some Chinese corporations as compared to *Shariah* compliant equivalents. This represents an important aspect to take into account when assessing the incorporation of Chinese stocks within a *Shariah* compliant fund and the impact of any possible sanctions on the company’s performance.

Figure 1: Comparison of debt to equity, price to book and revenue growth ratios for the MSCI US Islamic and the MSCI China ETFs.

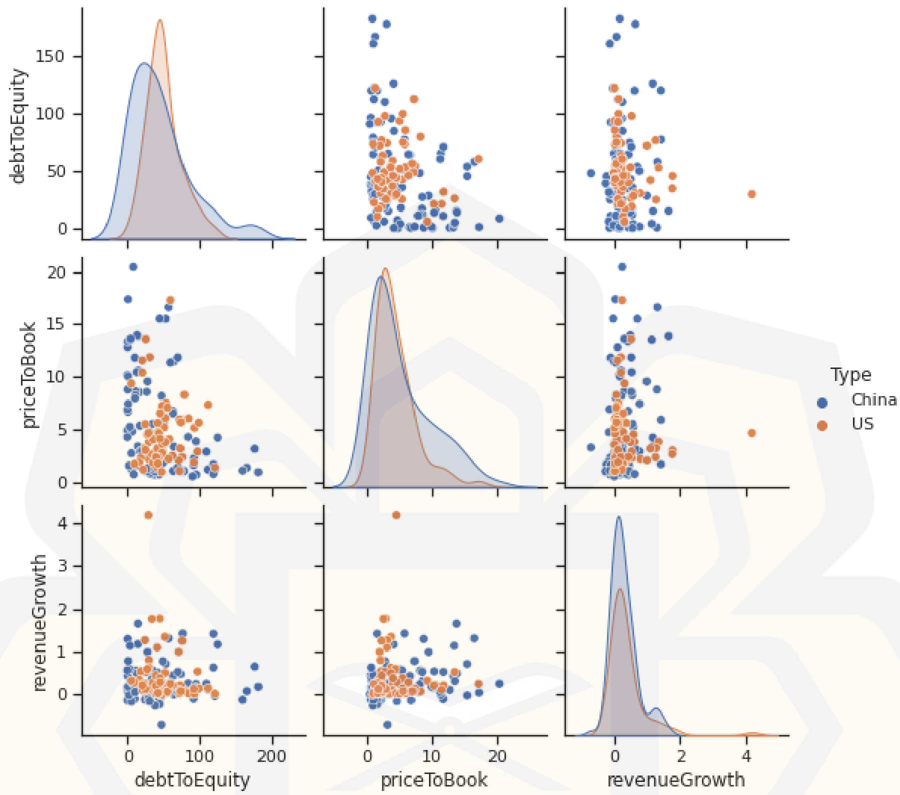
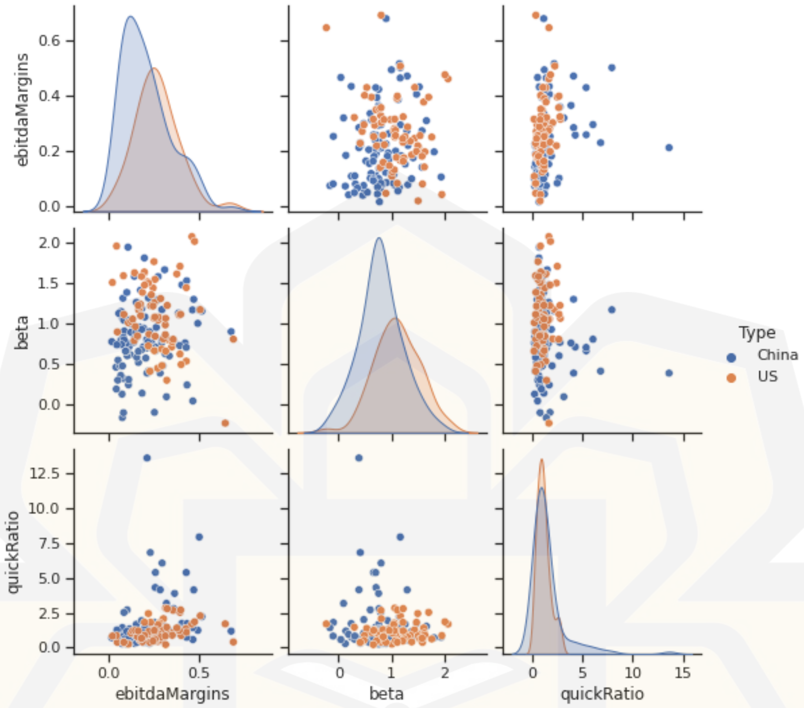


Figure 2 expands the previous analysis and compares EBITDA margins, beta and the quick ratio against each other. The analysis shows in general lower EBITDA margins of Chinese corporations as compared to their *Shariah* compliant US counterparts. The results indicate that there are several Chinese corporations that have high quick ratios, which implies that their financial position allows them to easily satisfy short-term liabilities.

Figure 2: Comparison of EBITDA Margins, beta and quick Ratio for the MSCI US Islamic and the MSCI China ETFs.



The subsequent step is to cluster the remaining corporations according to their financial performance in order to be able to select an adequate subset for the portfolio optimization. For the clustering, the k-means algorithm was utilized that delivered stable performance results. A key aspect in the k-means algorithm is the optimal number of clusters for the data under consideration, in order to better determine their uncertainties. A key objective is to determine corporations that may lead to significant uncertainties and risks that are beyond the scope of a distributionally robust portfolio, considering possible sanctions. The best clustering number was determined to be 3 with the cluster 2 incorporating those corporations that may not be adequate for a robust portfolio. Specifically, the components of the cluster 2 exhibit high debt to equity ratios, which may pose significant risks to the performance of the corporations in the possible situation of sanctions or trade challenges.

Figure 3: Clustering performance for the combined dataset for debt to equity, price to book and revenue growth values.

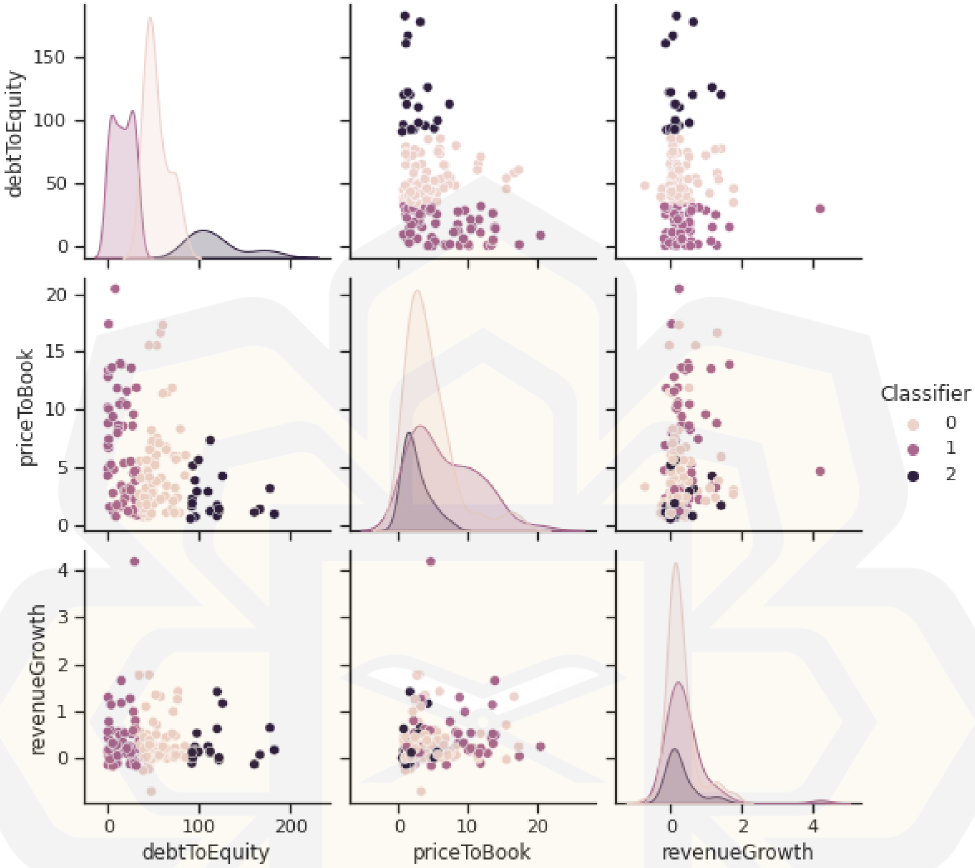
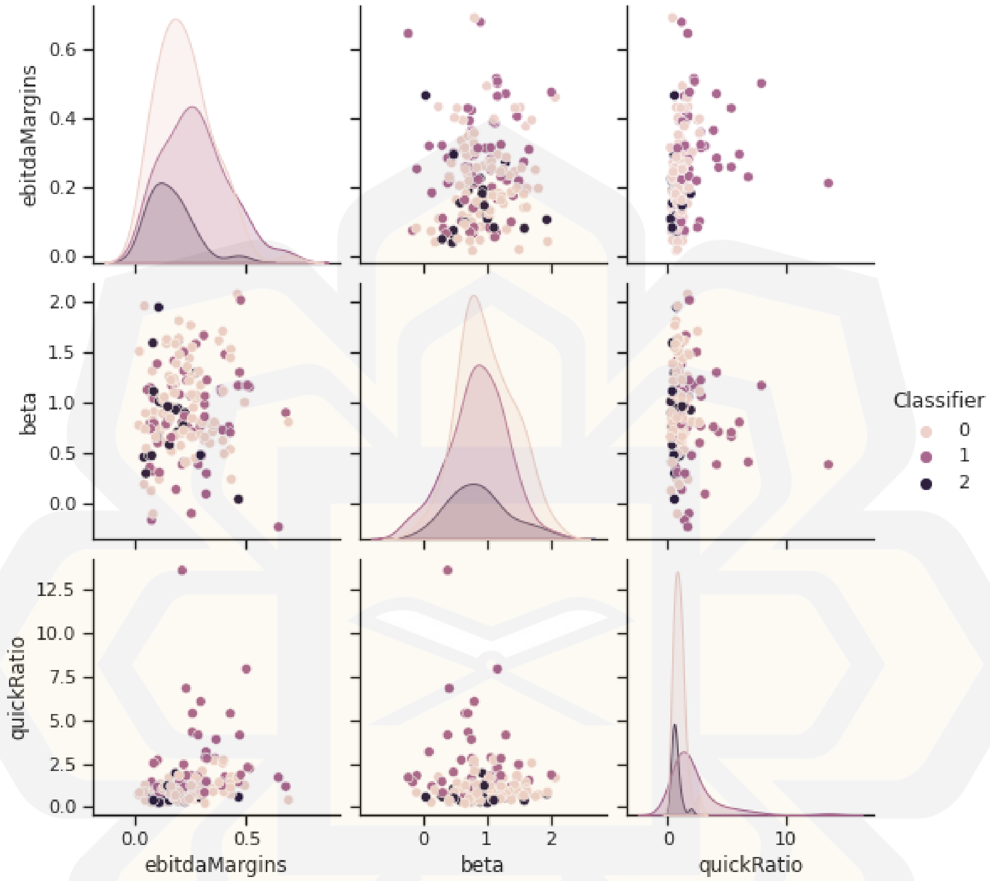


Figure 3 shows the clustering for the debt to equity, price to book and revenue growth where the corporations in the cluster 2 exhibit high debt to equity ratios which may be more affected in the case of sanctions. Price to book as well as revenue growth, and the comparison in Figure 4 shows that the debt-to-equity ratio is a major distinguishing factor. While beta and price to book ratios depend primarily on the developments in the stock price, debt to equity as EBITDA margins are reflective of the real performance of the corporation as compared to the stock prices. Given the high debt to equity ratios and possible illiquidity challenges, these corporations were excluded from the optimization.

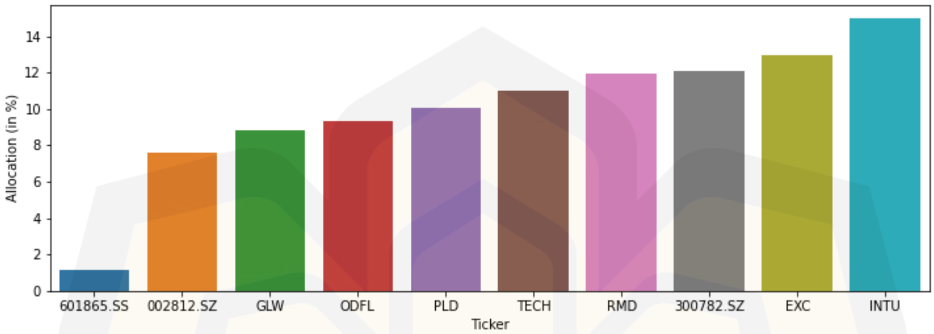
Figure 4: Classification performance for the EBITDA margins, beta and quick ratio.



With the adapted subset corporations, the distributionally robust optimization then selects the most optimal stocks given the worst underlying distribution. This necessarily may lead to an optimal portfolio that incorporates only a limited number of stocks in order to minimize both the worst possible event while maximizing the expected returns from the optimization profile. In order to model the uncertainty arising from sanctions imposed by either the United States or China on each other, we assumed that Chinese corporations will be more significantly affected by sanctions as compared to their US counterparts. Specifically, economic sanctions against the economy, range of companies or specific companies may significantly affect these companies to both obtain technology, as well as access financial resources or conduct transactions. As violations would in many cases imply, that transacting corporations would not be able to conduct business with US companies, within the United States or utilizing US financial institutions, this will significantly affect the companies' ability to do business with foreign entities and may lead it to being restricted to domestic companies. Furthermore, general investment into such entities typically decreases given the risk aversity of most investors as well as reduction in potential funds.

The most optimal portfolio is displayed in Figure 5 that shows the percentage allocation of the distributionally optimal robust portfolio. Specifically, the most optimal portfolio consists of 10 constituents, where 3 constituents are Chinese-listed corporations. These are the Maxscend Microelectronics Company LTD (300782.SZ), whose optimal percentage is 11 %, and Yunnan Energy New Material (002812.SZ) with a percentage of around 7.5 %. The final Chinese corporation is the Flat Glass Group (601865.SS) that has an allocation of around 1 %. All these three corporations are within different groups that may benefit from growing digitalization and the move to renewable energy sources. Furthermore, the impact of sanctions may be limited for these corporations given their business being primarily in sectors that may be less affected by sanctions given the overall significant demand.

Figure 5: Optimal portfolio obtained from the distributionally robust optimization framework.



The largest constituent is the Intuit Inc. that provides financial management and compliance products for small businesses and consumers. Sanctions imposed on China will minimally affect the corporation as it is primarily dependent on the United States and Canada for its turnover. Similarly, Exelon Corporation is an energy utility company solely operating in the United States and Canada and may be not be affected at all by sanctions related to China. This aspect is well observed in the various scenarios where the worst possible outcome for these corporations is limited to their current performance, while other corporations with a bigger international exposure to China may be more significantly affected. Corporations that may be heavily affected by sanctions are Dow Chemicals that have a significant presence within China and may require to divest or reduce their exposure to the country which will affect its business performance.

6. Conclusion and Recommendation

Sanctions have long been utilized as a form of forcing the sanctioned countries and entities to change their course and conform to the objectives of the sanction imposing country or entity. Sanctions have been primarily used for trade embargoes and restrictions on the types of goods and services that can be exported from a specific country. Financial sanctions have been instituted primarily in the last century given the growing importance of the international financial system and interconnection between countries. Furthermore, the growing importance of the US Dollar as an international reserve currency and the prevalence of US institutions to facilitate cross-border transfers, has transformed financial sanctions into very attractive tools for trying to achieve the sanction's objectives. While the effectiveness of financial sanctions is debatable, they have been still attractive for many nations to be employed. The United States and China have experienced considerable disagreements with respect to their view on trade terms and the exchange of information. This has led to the sanctioning of several businesses by the United States, and even forced some corporations to delist from the US exchanges. For investors, this poses a significant risk as corporations may be required to delist, which will lead to significant losses. We present a distributionally robust optimization framework for the optimal Islamic portfolio when taking into account the risk of sanctions. The key feature of the framework is that it both integrates Islamic values in addition to ensuring robustness against the impact of possible sanctions.

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Muslims' Perception of Islamic Insurance (*Takaful*) in Malaysia

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Abstract

Conventional insurance does not comply with the teachings of Islam. Experts of Islamic finance recommend *takaful* as an alternative to conventional insurance. Malaysia is on track to becoming a global center for Islamic finance; the Malaysian market harbors fifteen *takaful* companies. The *takaful* industry, compared to other Islamic financial areas, is relatively new, and the infiltration rate remains low. This study aims to compare products offered by Islamic insurance, conventional insurance, and products in general to analyze the strengths and weaknesses of Islamic insurance. A questionnaire was distributed to insurance policyholders following any religion residing in Malaysia. The snowball sampling method was used, and 500 responses were obtained, from which respondents (Muslim) (N=322) was analyzed. This study revealed that 1) there is room for improving the clearness of *takaful* when explaining its features to Muslim, and 2) *takaful* is lag the progress in many advertising methods such as websites, cinemas, and televisions.

Keywords: *Islamic insurance, takaful, Malaysia, muslim, penetration rate*

1. Introduction

The term *takaful* has become much of an attraction in the insurance market all across the globe today (Maysami and Kwon, 1999; Ahmad et al., 2010; Abdou et al., 2014; Salman, 2014a). Purveyed in Islamic and non-Islamic, *takaful*, with its many names like Islamic insurance, *Halal* insurance, ethical insurance, Islamic mutual insurance, co-operative insurance, and community insurance, has been accepted as the alternative to conventional insurance (Noordin et al., 2014). As with insurance businesses, *takaful* firms must be profit-oriented to compete with established insurance companies while adhering to *Shariah* compliance in all activities and products supplied by *takaful* companies (Hassan et al., 2018; Noordin et al., 2014).

The notion that insurance provides financial assistance when faced with any mishap or calamity makes it beneficial and entices people to pay a premium to secure their financial position against any misfortune (Ericson et al., 2003; Liu et al., 2017). For this reason, in many developed countries, insurance has become an integral part of one's daily activities and, in most cases, unavoidable (Chen and Chen, 2013; Venkateshwarlu, 2016). However, when inspected closely, products offered by insurance are based on elements like interest, uncertainty, and gambling (Iqbal, 2005; Kasim et al., 2016; Salman et al., 2019; Nazarov and Dhiraj, 2019). Since the outcome of these elements does not ensure fairness to all parties involved, therefore, Islam not only condones but strongly prohibits offering products based on these elements. The validity of insurance is a subject divided into three separate views (Rashid, 1993). The first viewpoint is that insurance is prohibited (Sohail, 2007). The second viewpoint leans toward insurance being permissible only in the case of necessity. The third suggests that conventional insurance be modified to become *Shariah*-compliant (Usmani, 2005; Dikko, 2014).

As a result, Muslim scholars established *takaful* as a substitute for conventional insurance. As stated by Salman (2014a), Htay et al. (2015), Dikko (2014), Salman (2014b), Salman and Htay (2013), Noordin et al. (2014), Billah (2007), Salman et al. (2018), and Ayub (2003), *takaful* is founded on the principles of *tabarru'* and *ta'awun*, which are respectively voluntary donation and cooperation (Htay and Salman, 2013; Noordin, 2014; Faruk and Rahaman, 2015; Htay and Salman, 2015; Salman et al., 2017; Hassan et al., 2018; Naim, 2020;

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Shaifuddin, 2020; Khairi, 2020; Istiqomah and Gati, 2020).

Based on these two primary principles, contractual relationships are built between clients and *takaful* operators. At present, there are various types of *takaful* models. The most adopted by *takaful* operators are the Cooperative (*taa'wuni*) Model, Pure *Wakalah* (Agency) Model, and Modified *Wakalah* Model (*Wakalah* with Incentive Compensation), Pure *Mudarabah* (Investment Profit-Sharing) Model, Modified *Mudarabah* Model, Hybrid *Wakalah-Mudarabah* Model, and *Waqf* Model. *Takaful* products are categorized into two types. One is 'General *Takaful*,' which entails providing general *takaful* products for insuring one's motor vehicle, safety against fire, and any damage to marine transport/ cargo. The other is 'Family *Takaful*,' which offers family *takaful* products like health insurance, investment plans, and education (Htay & Zaharin, 2012; Ernst and Young, 2013; Htay and Salman, 2013; Salman, 2014a; Hassan, 2019; Malik and Ullah, 2019).

With its continuous developments in Islamic financial services, Malaysia aims to become the leading global Islamic financial hub (El Qorchi, 2005; Dewa and Zakaria, 2012; Hassan and Salman, 2017). The Malaysian *takaful* industry has also been increasing in the last few decades (Abu-Hussin et al., 2014), with fifteen *takaful* companies, both general and family *takaful*, currently open to the Malaysian market (Arshad and Irijanto, 2020; Mohamed et al., 2020). As per the Malaysian Takaful Association (2017), the Malaysian *takaful* business grew exponentially between 2010 and 2017, with total assets valued at RM 6.8 million in 2010 and RM 29.3 billion in 2017. This figure is anticipated to increase by 18% in 2019 (Husin, 2019).

As a substitute for conventional insurance, the *takaful* sector confronts stiff competition. Additionally, the lack of a secondary market, the inadequacy of Islamic law's infrastructure, and the scarcity of research on *takaful* concerns obstruct the growth of *takaful* products. Islamic insurance must ensure that all products offered are in line with *Shariah*. Due to this reason, the products offered are few. For the *takaful* market to heighten infiltration, the increase in *takaful* companies needs to be accompanied by the rise in *takaful* products. Extensive research on ways to develop *takaful* products is of much essence, as pointed out by many researchers (Johnes et al., 2009) and other researchers in their studies also suggested an increase in the evaluation of *takaful* companies using financial ratios to compare results with conventional insurance companies (Abdou et al., 2014).

Malaysia is primarily a Muslim country that adheres to *Shariah* rules. However, compared to the conventional insurance business, the *takaful* sector has significantly been unable to affect the insurance industry (Nordin, 2018). To increase the penetration rate of *takaful* in Malaysia, which is currently remains remarkably low, it is pertinent to understand Muslims' predicament in opting for *takaful* products. There have been studies examining the reasons, but to the best of the authors' knowledge, there remains a lacuna in comparing factors that characterize Islamic insurance (*takaful*) with other products. Therefore, this study aims to compare products offered by Islamic insurance, conventional insurance, and products in general to analyze the strengths and weaknesses of Islamic Insurance.

2. Literature Review

Kader et al. (2010) use non-parametric Data Envelopment Analysis (DEA) in their article to investigate the cost efficiency of *takaful* firms. Using a second-stage logit transformation regression model, the influence of corporate governance factors on cost efficiency is also investigated. Data were retrieved from the World Islamic Insurance Directory to conduct these analyses, a balanced panel data set of 78 firm-years from 2004 to 2006, including 26 *takaful* non-life insurance firms. Their investigations revealed that cost efficiency is not dependent on non-executive directors or separating the Chief Executive Officer and Chairman, nor does the regulatory environment substantially influence cost efficiency enhancement. Rather than that, the beneficial impacts on cost efficiency are determined by board size, firm size, and product specialization.

Rahman and Daud (2010) investigate the medical and health *takaful* participants in Malaysia and study their behavior. On examining 300 respondents, they discovered that medical and health *takaful* face the issue of adverse selection. Most of the claims get rejected when the managed care organization, on further inspection, finds irregularities in the information provided by the applicants.

Noordin et al. (2014) and Dikko (2014) raise concerns about the *Shariah* compliance of *takaful* products and if they continue to be based on the *tabarru'* and *ta'awun* concepts. According to Dikko (2014), various *takaful* models raise multiple concerns, including whether the products are on *takaful's* core ideas and are *Shariah*-compliant.

Eldaia et al. (2020) state that although the *takaful* industry has been rapidly growing, Malaysia faces regulatory and technical challenges regarding competitive components business models, altering customers' requirements and demands for better product selections.

According to Husin (2019), much attention should be given to the industry for the *takaful* industry to strengthen its position and increase its market share over its traditional counterpart. Lack of awareness amongst the population of the essential spirit of *takaful*, inadequate regulations and corporate governance, scarcity of human resources, lack of innovation and unsuitability of products, and limited funds to manage *takaful* finances are all challenges the *takaful* industry continues to tackle. Nonetheless, the *takaful* industry treats its consumers and companies equitably and increases the infiltration rate. And for that, the *takaful* industry should aim to observe new trends in global economics and become the only best option for not just Muslims but consumers of all faith worldwide.

Mohamed and Alhabshi (2015) listed several factors highlighted by the interviewees that discourage customers from opting for *takaful*. Some of the factors mentioned were consumers' lack the knowledge of the benefits of *takaful* over conventional insurance, lack of innovation and variety of products, shortage of human resources, specifically the frontline workers to explain the *takaful* products efficiently, and finally, the need to improve market strategies and increase distribution channels.

Htay et al. (2013) examined five *Shariah* scholars' (academician) perspectives on the topic in their study of the variables. The study used the Delphi approach, and the findings indicate that most *Shariah* scholars are unfamiliar with the underwriting and risk assessment processes of family *takaful*. Despite this, the scholars assert that while *Shariah* does not prohibit the underwriting process, some of the factors utilized in the process should be re-examined. Although the *takaful* business is fresh compared to the conventional insurance, the Islamic legislation governing it is self-contained and addresses all concerns within the industry. Malaysia is a Muslim country, yet common law has ruled the country since colonialism.

Lambak and Tahir (2013) examine the possibility of applying common law in the existing Malaysian Takaful Act 1984. Their findings show that common law can be used if *Shariah* is not compromised. Compared to the market's rapid growth, the regulatory framework is relatively slow. The timely and speedy issuance of relevant rules and guidelines will ensure that both the regulatory framework and the market move simultaneously, parallel to one another.

Hassan and Salman (2017) look at *Shariah* advisers' thoughts on introducing new *takaful* products in Malaysia. A combination of convenient and purposive selection techniques is used to choose the eleven *Shariah* advisers for the interview. *Shariah* advisors concluded that various opportunities awaited exploration for the industry. Experimentation is a technique for identifying potential. Products, marketing, pricing, customer service, and distribution techniques are just a few of the sectors within the *takaful* industry that might be improved. Additionally, a client's lack of understanding of *takaful* creates many complexities and issues. *Shariah* experts have made numerous reasonable clarifications, including suggestions that some *takaful* industry in certain regions be upgraded to become more inventive.

Ansari (2022) synthesizes the last two decades of *takaful* literature published between 2000 and 2019 and suggests some significant areas for future research. The study methodically reviews the literature. The Scopus database was consulted for this investigation, and 96 papers were included. The articles are classified according to their primary topics, including consumer behavior, financial and non-financial performance, *takaful* models, human resources, and governance. The study contributes to the *takaful* literature by reviewing papers according to particular themes, filling in gaps in existing literature surveys with noteworthy findings.

Salman and Kawata (2021) examine the characteristics that encourage involvement in Islamic insurance using Malaysian insurance policyholders. Both logit and probit models are used to analyze data from Muslims and non-Muslims in two scenarios: adoption of Islamic insurance and conversion from conventional to Islamic insurance. The estimation results indicate that the determinants affecting Muslims' and non-Muslims' adoption and shift to *takaful* are distinct, emphasizing that different tactics are necessary to encourage adoption and transition to *takaful*.

According to Hassan et al. (2022), their study intends to ascertain the reasons for *takaful* rejection and to promote *takaful* among Malaysian adolescents. The sample for this study consists of 53 Malaysian youngsters recruited from various sources. The data for this investigation were acquired using a random sampling technique. For statistical analysis, this study used descriptive statistics and correlation coefficients. Religion, social status, product features, marketing, agent qualities, and the quality, availability, and transparency of *takaful* services all contribute to its adoption success. Most respondents, on the other hand, are unfamiliar with the *takaful* concept, as well as its level of awareness and coverage.

3. Materials and Methods

3.1 Survey

A questionnaire survey was conducted in Malaysia between 20 December 2019 and 10 January 2020. The population was set to be Malaysian who were insurance policyholders. A snowball sampling was used, and about 500 policyholders of both Muslims and non-Muslims replied to the same style questionnaire. Snowball sampling is a technique in which research participants recruit additional subjects for a test or study. It is utilized in situations where participants are scarce. Snowball sampling is so-named because, in theory, once the ball is rolling, it gathers up more "snow" along the way and grows in size. Snowball sampling is a non-probability method of sampling. Because this study involves examining insurance policyholders, we used snowball sampling to find specific respondents. People of all religions were allowed to participate in the questionnaire.

The questionnaire was divided into two main parts. The first part contained the questions about subjects' sociodemographic factors such as age, and the second part included the questions about products and associated features. In the latter role, the respondents were asked on three different products: 1) products in general, 2) conventional insurance, and 3) Islamic insurance. They were further asked to reply to questions concerning four topics: 1) products, 2) agents, 3) marketing, and 4) social for these three products. These four topics were selected because products, agents, marketing, and social are the main aspects of *takaful*; that is, "product" features *takaful* itself, "agents" and "social" imply supply and demand players, and marketing all these three components. In other words, the relevant aspects of *takaful* for this study were categorized into these four topics. These four topics consisted of 5 different questions (Table 1). Therefore, respondents answered 60 (= 3 × 4 × 5) questions. All 60 questions were asked using a five-point Likert scale.

Table 1 Twenty questions on products, agents, marketing, and social

PRODUCT1	High-observability items increase your curiosity about adopting new products.
PRODUCT2	Simple-to-understand product, for example, a worded insurance describing premium payment, coverage, the claim process, surrender procedures, and maturity advantages.
PRODUCT3	A simple explanation of the advantages of buying the product.
PRODUCT4	Product characteristics are sufficiently flexible to meet the demands of policyholders.
PRODUCT5	If you choose between products, you will be interested in trying the new ones if all the old and new products' features and functions are similar.
AGENTS1	A person who is moral, reliable, and accountable.
AGENTS2	Recognize the customer's needs and be able to recommend an appropriate product.
AGENTS3	Justify and reveal the product's truthfulness.
AGENTS4	At all times, maintain positive contact with the consumer.
AGENTS5	Always willing to assist when necessary.
MARKETING1	Advertising on social media sites. An influencer's effects.
MARKETING2	On-line advertisements.
MARKETING3	Roadshow
MARKETING4	Opening booths at conferences, education fairs, gatherings, and grocery stores.
MARKETING5	Cinemas, television networks, and radio stations all have advertisements.
SOCIAL1	Your parents, friends, and coworkers, for example, may all encourage you to buy a new product.
SOCIAL2	Participation in new products is facilitated through group discussions among peers and opinion leaders.
SOCIAL3	You must adopt the new products due to demand from your company.
SOCIAL4	If the product contains forbidden elements, you are willing to locate an alternate solution that is allowed in your faith.
SOCIAL5	When choosing among the available products, I value honesty and fairness.

3.2 Methods

To understand the status of Islamic insurance (*takaful*), respondents replied to 20 questions (= 4 topics × 5 different questions) for products in general (hereafter referred to as P), twenty questions for conventional insurance (C), and twenty questions for Islamic insurance (I) were compared based on the statistical test. For conducting multiple comparisons, Wilcoxon signed-rank test was selected. R's statistical test was performed (R Core Team, 2021). Because there were three groups, the Holm method was applied when calculating p-values. The exact test was chosen in all applications of tests. The null hypotheses were as follows.

> H_0 for P-C: The median difference between "products in general" and "conventional insurance" is zero.
> H_0 for P-I: The median difference between "products in general" and "Islamic insurance" is zero.
> H_0 for C-I: The median difference between "conventional insurance" and "Islamic insurance" is zero.

There were three hypothetical tests above: H_0 for P-C, H_0 for P-I, and H_0 for C-I. They were 13 combinations of hypothetical test results (six, six, and one for the following cases). There were 6 cases if all three hypotheses were rejected, and median values of P (products in general), C (conventional insurance), and I (Islamic insurance) were statistically significantly different. As shown in Table 2, these cases are 3A, 3B, 3C, 3D, 3E, and 3F. There were 6 cases if two of three hypotheses were accepted. There was one case in which all three hypotheses were accepted. Based on the results of H_0 for P-C, P-I, and C-I, and the order of median values of P, C, and I, twenty questions were categorized these 13 types as shown in Table 2.

Table 2 Categorization of 20 questions based on H_0s

Type	**H_0 for P-C**	**H_0 for P-I**	**H_0 for C-I**	**median**
3A	rejected	rejected	rejected	P ≥ C ≥ I
3B	rejected	rejected	rejected	P ≥ I ≥ C
3C	rejected	rejected	rejected	C ≥ P ≥ I
3D	rejected	rejected	rejected	C ≥ I ≥ P
3E	rejected	rejected	rejected	I ≥ P ≥ C
3F	rejected	rejected	rejected	I ≥ C ≥ P
2A	accepted	rejected	rejected	P, C ≥ I
2B	accepted	rejected	rejected	I ≥ P, C
2C	rejected	accepted	rejected	P, I ≥ C
2D	rejected	accepted	rejected	C ≥ P, I
2E	rejected	rejected	accepted	C, I ≥ P
2F	rejected	rejected	accepted	P ≥ C, I
1A	accepted	accepted	accepted	Note 1

Note 1: There is no statistically significant difference among P, C, and I.

4. Results

4.1 Score distributions, hypotheses testing, and median values

Although we allowed both Muslims and non-Muslims to participate in the questionnaires, the sample size of non-Muslim (N=178) was too small to obtain precise results. Thus, this study uses only replies from Muslims (N=322). The demographic background of Muslim respondents is tabulated in Table 3.

Table 3 The demographic background of Muslim respondents

		N	
Gender	Male	138	42.9%
	Female	184	57.1%
Age (years old)	20-25	11	3.4%

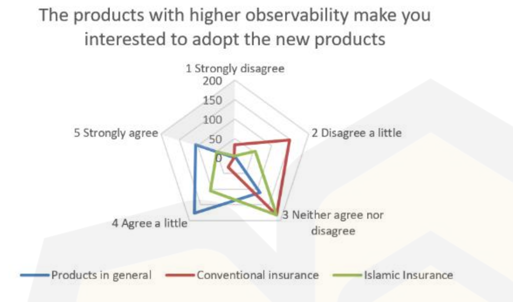
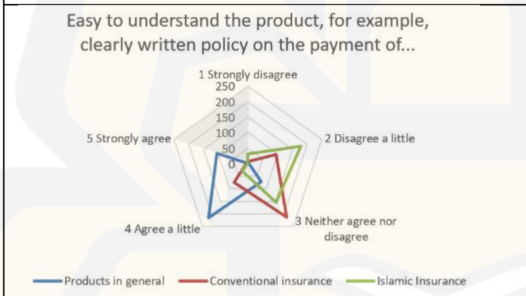
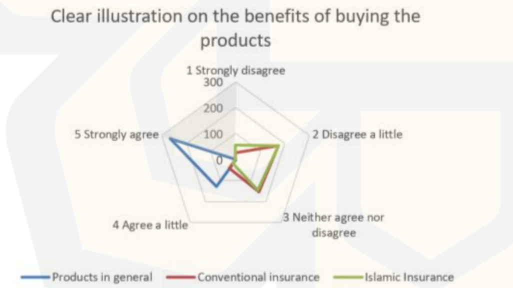
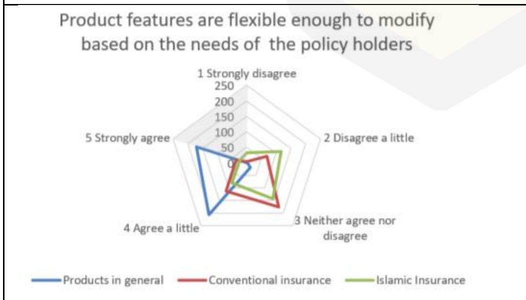
	26-30	33	10.2%
	31-35	70	21.7%
	36-40	87	27.0%
	41-45	48	14.9%
	46-50	39	12.1%
	51-55	20	6.2%
	56-60	9	2.8%
	61-	5	1.6%
Educational background	Certificate	27	8.4%
	Diploma	59	18.3%
	Bachelors	82	25.5%
	Masters	83	25.8%
	PhD	44	13.7%
	Professional	27	8.4%
Marital status	Single	40	12.4%
	Married	251	78.0%
	Others	31	9.6%
Annual salary (RM.)	-1,999	34	10.6%
	2,000-2,999	48	14.9%
	3,000-3,999	58	18.0%
	4,000-4,999	63	19.6%
	5,000-5,999	49	15.2%
	6,000-6,999	40	12.4%
	7,000-7,999	23	7.1%
	8,000-	7	2.2%
Occupation	Private sector	110	34.2%
	Government sector	101	31.4%
	Self-employed	95	29.5%
	Retired	6	1.9%
	Unemployment	10	3.1%

The distributions of scores of 20 questions for all three products (P, C, and I) are shown in Figures (1 to 4), together with the results of hypotheses testing and median values for P, C, and I. Here, ***, **, and * indicate statistical significance at the 1%, 5%, and 10%, respectively. Based on the hypotheses testing and the median values, a type such as "3B" is also detected and shown in each right-hand cell of the Figures.

The average score of all respondents for 20 questions is calculated. The values are 4.1, 3.2, and 3.3 for products in general, conventional insurance, and Islamic insurance, respectively. These results imply that people evaluate a product in general (4.1 points) nearly 1 point higher than conventional insurance (3.2 points) and Islamic insurance (3.3 points), while the score of conventional and Islamic insurance was almost the same. The number of median values was also counted and tabulated in Table 4. Generally, the median values of products concentrate on points 5 and 4 while those of conventional and Islamic insurances are mainly pointed around 3.

The results of the types of 20 product features reflect the above. Seven product features are categorized as type 2F, 5 for types 3A, and another 5 for 3B (Table 5). These types share a common feature: Both "H_0 for P-C" and "H_0 for P-I" are statistically significantly different, and the median value of P is more significant than C and I. One product feature is type 2A, where H_0 for P-I" holds while "H0 for P-C" is not, and the median values of P and I are higher than C. P's character is the most evaluated (with I). There are only two cases where I's character is the most evaluated, followed by C and P. These are type 3E for Marketing 3 and type 3F for Social 4.

Figure 1 Results of "Product Features"

	[**Products 1**] High-observability items increase your curiosity about adopting new products. P-C ***, P-I ***, C-I *** Median P= 4, C = 3, I = 3 Type: 3B
	[**Products 2**] Simple-to-understand product, for example, a worded insurance describing premium payment, coverage, the claim process, surrender procedures, and maturity advantages. P-C ***, P-I ***, C-I *** Median P = 4, C = 3, I = 2 Type: 3A
	[**Products 3**] A simple explanation of the advantages of buying the product. P-C ***, P-I ***, C-I ** Median P = 5, C = 3, I = 2 Type: 3A
	[**Products 4**] Product characteristics are sufficiently flexible to meet policyholders' demands. P-C ***, P-I ***, C-I *** Median P = 4, C = 3, I = 3 Type: 3A

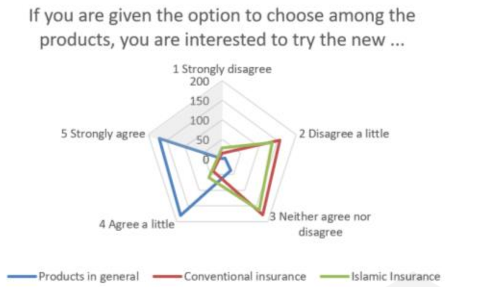
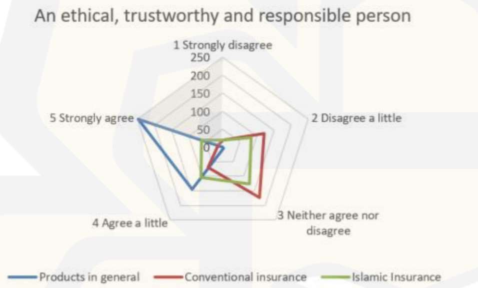
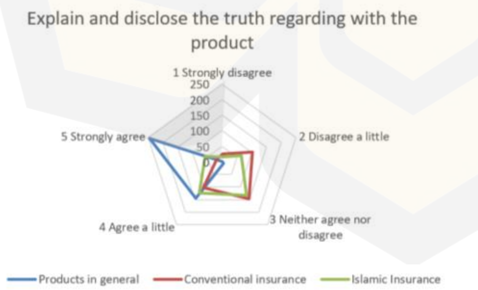
	[**Products 5**] If you are offered to choose between products, you will be interested in trying the new ones if all of the old and new products' features and functions are similar. P-C ***, P-I ***, C-I Median P = 4, C = 3, I = 3 Type: 2F

Figure 2 Results of "Attributes of agents"

	[**Agents 1**] A moral, reliable, and accountable person. P-C ***, P-I ***, C-I *** Median P = 5, C = 3, I = 3 Type: 3B
	[**Agents 2**] Recognize the customer's needs and recommend an appropriate product. P-C ***, P-I ***, C-I Median P = 4, C = 3, I = 3 Type: 2F
	[**Agents 3**] Justify and reveal the product's truthfulness. P-C ***, P-I ***, C-I *** Median P = 5, C = 3, I = 3 Type: 3B

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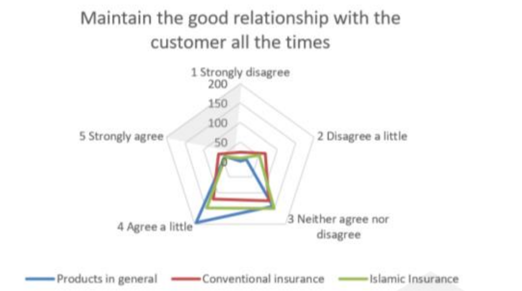
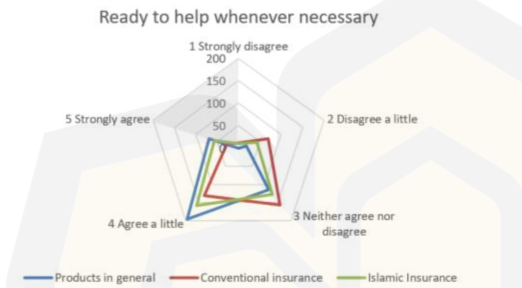
<tr><td>
</td><td>[Agents 4] Maintaining positive contact with the consumer at all times.

P-C ***, P-I **, C-I
Median P = 4, C = 3, I = 3
Type: 2F</td></tr>
<tr><td>
</td><td>[Agents 5] Always willing to assist when necessary.

P-C ***, P-I **, C-I ***
Median P = 4, C = 3, I = 4
Type: 3B</td></tr>
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Figure 3 Results of "Marketing and promotion"

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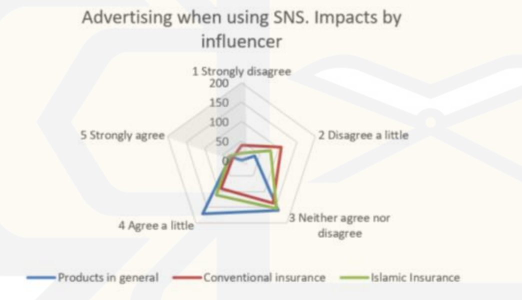
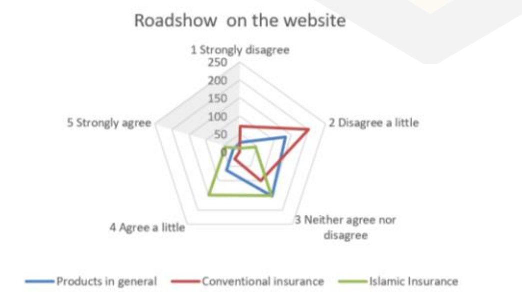
<tr><td>
</td><td>[Marketing 1] Advertising on social media sites. An influencer's effects.

P-C ***, P-I ***, C-I **
Median P = 4, C = 3, I = 3
Type: 3B</td></tr>
<tr><td>
</td><td>[Marketing 2] Online advertisements.

P-C ***, P-I ***, C-I ***
Median P = 4, C = 4, I = 3
Type: 3A</td></tr>
<tr><td>
</td><td>[Marketing 3] Roadshow

P-C ***, P-I ***, C-I ***
Median P = 3, C = 2, I = 3
Type: 3E</td></tr>
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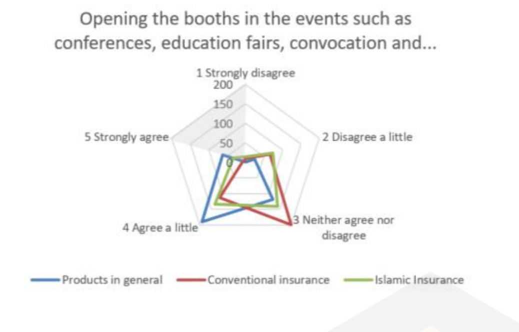

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[**Marketing 4**] Opening booths at conferences, education fairs, gatherings, and grocery stores.

P-C ***, P-I ***, C-I

Median P = 4, C = 3, I = 3

Type: 2F
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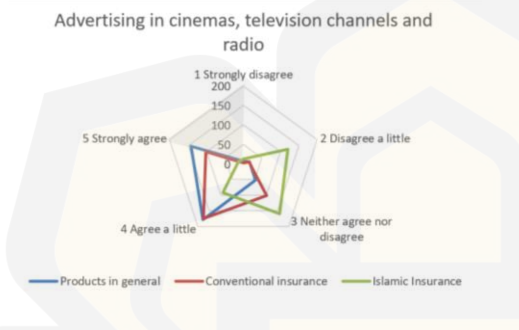

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[**Marketing 5**] Cinemas, television networks, and radio stations have advertisements.

P-C, P-I ***, C-I ***

Median P = 4, C = 3, I = 3

Type: 2A
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Figure 4 Results of "Social and religious factors"

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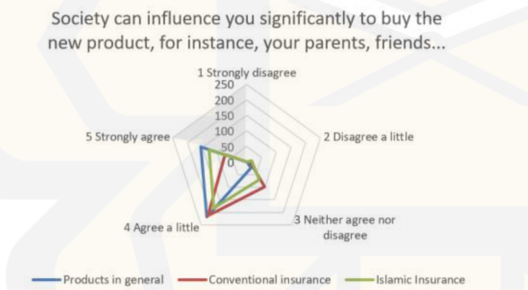

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[**Social 1**] Your parents, friends, and coworkers, for example, may all encourage you to buy a new product.

P-C ***, P-I ***, C-I

Median P = 4, C = 4, I = 4

Type: 2F
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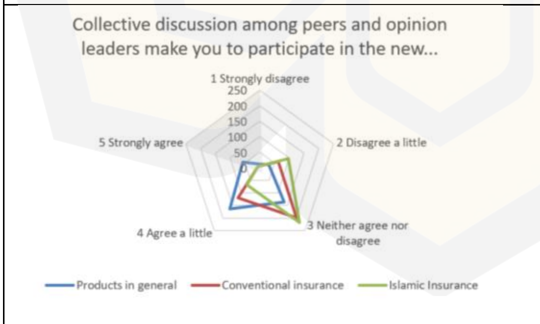

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[**Social 2**] Participation in new products is facilitated through group discussions among peers and opinion leaders.

P-C ***, P-I ***, C-I **

Median P = 4, C = 3, I = 3

Type: 3A
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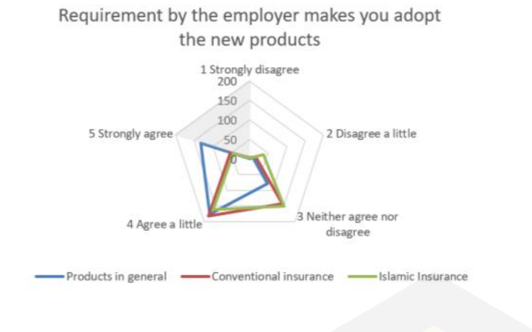
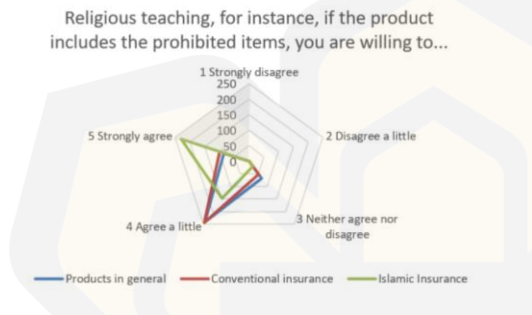


[**Social 3**] You must adopt the new products due to demand from your company.

P-C ***, P-I ***, C-I

Median P = 4, C = 4, I = 4

Type: 2F



[**Social 4**] If the product contains forbidden elements, you are willing to locate an alternate solution that is allowed in your faith.

P-C, P-I ***, C-I ***

Median P = 4, C = 4, I = 5

Type: 3F

[**Social 5**] When choosing among the available products, I value honesty and fairness.

P-C ***, P-I ***, C-I

Median P = 5, C = 4, I = 4

Type: 2F

Table 4 Average score and the number of median values of 20 product features

		Products in general	Conventional insurance	Islamic insurance
Average		4.1	3.2	3.3
Median	5	4	0	1
	4	15	6	4
	3	1	13	13
	2	0	1	2
	1	0	0	0

Table 5 Results of the type categorization

Type	Products	Agents	Marketing	Social
3A	2, 3, 4		2	2
3B	1	1, 3, 5	1	
3E			3	
3F				4
3C, 3D	None			
2A			5	

2F	5	2, 4	4	1, 3, 5
2B, 2C, 2D, 2E	None			
1A	None			

5. Discussions

5.1 Current status of Islamic insurance

The comparisons between P, C, and I using a five-point Likert scale reveal that Muslims' evaluation of *takaful* is lower than products in general but is almost the same as conventional insurance. The average P, C, and I scores are 4.1, 3.2, and 3.3 respectively. The distribution of scores for a product in general (mainly 4 and 5) is different from those of conventional and Islamic insurance (especially 3).

Type 3E for Marketing 3 and type 3F for Social 4 are exceptions, where I's character is the most evaluated, followed by C's and P's characteristics. Marketing 3 is "roadshow," and Social 4 is "If the product contains forbidden elements, you are willing to locate an alternate solution allowed in your faith." It may be possible to infer that the score for Marketing 3 and Social 4 is the highest for Islamic insurance. A roadshow in Marketing 3 is the most traditional style of marketing when compared to others such as SNS in Marketing 1, websites in Marketing 2, booths in events in Marketing 4, and advertising in cinema. The image of a roadshow may be the most suitable for Islamic insurance because the roadshow makes it possible for Muslims to communicate with the staff of insurance companies. Social 4 describes "prohibited items" and an "alternative product that is acceptable in your religion," while others treat "new products" in Social 1, 2, and 3. Social 4 may be the most suitable for Islamic insurance, and thus the score is the highest.

5.2 Weakness

In what follows, products, in general, are removed from the discussion. It is because it may be natural that people's insurance evaluation is lower than a product in general. Following that, conventional and Islamic insurance are compared. Because we remove P, we may summarize more simply in Table 6. The results show that Muslims' evaluation of product features of Product 5, Agents 2 and 4, Marketing 4, Social 1, 3, and 5 are almost the same for both conventional and Islamic insurance because H_0 for C-I is accepted. Muslims' evaluation of the following features is higher for conventional insurance than for Islamic insurance: Products 2, 3, and 4, Marketing 2 and 5, and Social 2. On the other hand, Muslims' evaluation of the following features is higher for Islamic insurance than for conventional insurance: Products 1, Agents 1, 3, and 5, Marketing 1 and 3, and Social 4.

Table 6 Comparison of product features of conventional and Islamic insurances

	H_0 for C-I		
	Accepted	Rejected	
		$C \geq I$	$I \geq C$
Products	Products 5	Products 2, 3, 4	Products 1
Agents	Agents 2, 4		Agents 1, 3, 5
Marketing	Marketing 4	Marketing 2, 5	Marketing 1, 3
Social	Social 1, 3, 5	Social 2	Social 4

Muslims evaluate Products 2, 3, and 4 higher for conventional insurance than Islamic insurance. It may suggest that Islamic insurance has room for improving the clearness of explanation on products (Products 2 and 3) and for flexibility in modification based on the needs of the policyholders (Product 4). Muslims also evaluate Marketing 2 and 5 higher for conventional insurance than Islamic insurance. It may suggest that Islamic insurance is behind the progress in advertising such as websites, cinemas, televisions, etc. Muslims' evaluation of Social 2 was also low for Islamic insurance. Social 2 describes that "participation in new products is facilitated through group discussions among peers and opinion leaders." Because Social 2 includes the new products, this feature is less suitable for Islamic insurance, resulting in the worst score. These features may be a weakness of Islamic insurance. To enhance the penetration rate of *takaful* in Malaysia, it is recommended to improve these features of *takaful*.

5.3 Strength when compared to conventional insurance

On the other hand, Muslims evaluate the following features of Islamic insurance more than conventional insurances: Product 1, Agents 1, 3, and 5, and Social 5. Product 1 states that high-observability items increase your curiosity about adopting new products. While insurance may be ambiguous in general, Islamic insurance may have more observability in that this insurance is based on Islamic teaching. Agents 1, 3, and 5 describe the features, such as trustworthy and responsible agents who explain the truth of the product and assist you whenever necessary. These features are very much associated with Islamic insurance. Social 4 describes the religious aspects of the product, and thus Islamic insurance has a high score. Based on the above, Islamic insurance has an advantage in observability, trust, and religious considerations of the product itself and associated agents and society. These features should be maintained and may be enhanced to improve the penetration rate of *takaful* in Malaysia.

6. Conclusion

It may be concluded that the primary issue in Islamic insurance is that Muslims underrate *takaful* products compared to products in general. To enhance the penetration rate of *takaful* in Malaysia, a detailed study of the strength and weaknesses of Islamic insurance is essential. There are about 20 product features in Islamic insurance, out of which only two products have secured the highest evaluation by Malaysian Muslims. It shows that there is enormous scope for improvement. Customers' lack of essential information and technicalities of the products and services offered by *takaful* companies will directly affect their motivation to participate and avail of the services provided (Alnemer, 2015). The British Government was the first to realize the importance of imparting financial knowledge to customers and, therefore, launched the Financial Capability Steering Group to examine consumer education. Subsequently, it called out to all other countries to follow the Financial Service Authority (FSA) consumer education program (Alnemer, 2015). Education is the first step to enhance the infiltration rate of *takaful* products in the market. The *takaful* operators need to make an effort to increase awareness amongst the Malaysian consumers and help them understand the basics along with the benefits of participating in *takaful*. The Government of Malaysia can play a significant role in imparting the required knowledge to its citizens with a keen focus on educating the youth. When two products are offered, a customer chooses one that is ethically provided. All other features such as benefits and costs are the same. However, education encourages one to think out of the box. Education allows one to understand the importance of ethicality, justice, corporate and social responsibility for other benefits. *Takaful* embodies these traits, and with education, demand for *takaful* will undoubtedly continue to grow, at least on ethics.

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An Innovative AI Blockchain Framework for Islamic Microfinancing

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Abstract

The digital economy has undergone significant transformations with blockchain becoming a household name in the fintech environment. Besides powering cryptocurrencies, blockchain technology enables power transactions in a variety of forms and enables decentralization which may reduce transaction costs. Islamic microfinance has become important with many new institutions arising in order to satisfy the demand for microfinance services while ensuring that these services comply with the *Shariah* Law. Cost of transactions and low degree of digitalization are the major obstacles with current solutions. We present an innovative blockchain artificial intelligence framework for the optimization of Islamic microfinance service provisioning as well as providing financial and transaction services in order to ease transactions and make them more secure and readily available. The framework was evaluated on a large dataset from the Central African Republic, and we could demonstrate strong performance of the AI-blockchain framework. The framework provides a viable solution for Islamic microfinancing to enhance transactions services and overcome some of the existing challenges with Islamic finance

Keywords: Islamic finance, microfinance, blockchain, artificial intelligence, decentralized ledger

1. Introduction

The digital economy has been a major game changer offering significant opportunities for individuals who do not have conventional access to the financial system (Dara, 2018). Conventional banking faces considerable challenges given the considerable cost incurred for consumers to access banking services. Specifically, low- and medium-income economies face considerable challenges in enabling more and more consumers to have access to financial services due to the significant overhead cost by conventional banks (Malim and Normalini, 2018). Most consumers in developing countries lack access to basic financial services, such as checking and savings accounts as well as loans (Gosavi, 2018). This implies that most of these individuals live primarily from paycheck to paycheck and have little to no savings. Furthermore, the opportunity cost and risk associated with aims to save on a monthly basis are hindered by the lack of adequate storage options, and the likelihood the funds will be at risk of being stolen. While there have been decades of efforts, conventional banking has marginally transformed the ability of these individuals to obtain basic banking and microfinancing options. Islamic financing has provided new opportunities for consumers to get easier access to Islamic banking services and experience a more equitable treatment when looking for financing (Mahadi et al., 2019).

1.1 Islamic microfinancing

Islamic microfinancing has increased tremendously in the last several decades. Poverty is one of the biggest challenges, and Islam actively encourages to do good to mankind and help their fellow men. More than three

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billion individuals live in abject poverty and the Islamic world experiences some of this hardship with more than 1.2 billion people experiencing poverty (De Haan et al., 2021). Both urban and rural communities in these countries experience poverty, which has been associated with high inequality in addition to low productivity. Microfinance has been considered as a valuable tool for supporting communities via providing them with crucial financing in order to reduce inequality and increase productivity (Jachimowicz et al., 2022). A fundamental question arises in terms of what the poor need in terms of financial services. Specifically, they are often faced with the challenge of outspending their income due to foreseen or unforeseen events. Generally, these events can be categorized into lifecycle events, emergency needs and investments (Beegle and Christiaensen, 2019). Lifecycle events are events that either taking place once or are recurring. Events that take place once are marriages, death, home construction or elderly care, while events that are recurrent are investments into education or festivals. Emergencies involve crises such as sickness or injury or the death of a family member that was earning a lifeline for the family. Furthermore, theft and natural disasters are a challenge that fall within the category of emergencies.

The last category is the opportunity to invest into land, businesses and other assets that may exceed the means of the individual. Micro-credit provides a solution to have these financial means in order to overcome the challenges. However, poor individuals need more than just credits, but also savings, money transfer facilities and insurance as well. Conventional microcredit in Muslim countries typically violates the prohibition of *riba* via charging interest rates on principle borrowed (Mohsin, 2020). While there are several Muslims who take advantage of the options of interest-bearing credit, a vast majority looks for options that do not violate *Shariah* law. Another form of financing is micro equity, which provides a micro-entrepreneur with micro venture capital, which can be in an Islamic form as trustee financing (*Mudarabah*), joint venture (*Musharakah*) or share-cropping (*Murabahah*). Another key component of microfinancing is micro-savings. Poor individuals face multiple challenges in that they have considerable demands on their low incomes and lack available deposit services that fits their needs and expectations. These individuals look for secure, and convenient deposit services that enable them to hold small balances and access these funds relatively easily. Accessibility to funds is a major challenge as many low- and medium-income countries face a lack of banks as well as low bank productivity (Mustapa et al., 2018). This makes it very challenging for normal individuals to use these banking services given the absence of being able to retrieve and deposit these funds. Furthermore, transferring money both domestically and internationally is another considerable challenge. Conventional money transfer services charge high commission fees for their services, which makes poor individuals who depend on these transfers very vulnerable (Nguyen, 2018). Furthermore, conventional shops such as those selling mobile phone cards and groceries are highly frequented by these individuals but they do not provide such services. Capable to provide these banking service would be a considerable benefit to the general population.

Microinsurance is another key area of interest for poor individuals. Shocks arising from natural disasters, death or sickness of family members may have a more significant impact on a poor's people ability to survive as compared to normal families (Schuster, 2021). Micro insurances provide low-income individuals with a safety net against unforeseen events and finance themselves from the subscription of a large pool of individuals or groups. In order for Islamic microinsurance to be effective, it has to be easy to understand and affordable and prioritizes the needs for those who need protection the most. The ideal Islamic framework is called *Takaful-Tawuni*, which is not-for-profit and takes on the form of guarantees by the members of the cooperative (Almulhim, 2019).

This implies that microfinance represents a key opportunity for low-income individuals that are typically excluded from the formal financial system. This disengagement causes these individuals not to be able to participate in the development process and take advantage of the economic opportunities, build assets and finance the education of their children. This causes these individuals to be trapped within a vicious circle of poverty.

A key feature of many developed economies is the support of entrepreneurship, which allows individuals to create new jobs and employ many more individuals. This job support creates wealth and employment for others and strengthens the economy. Microenterprise development is one of the core features of Islamic finance, with a strong focus on risk sharing and mutual success in the business relationship (Ahamad et al., 2020).

When looking at entrepreneurship, there are livelihood and growth enterprises that an individual may invest in. A livelihood enterprise is a state of entrepreneurship that an individual is pushed into in light of striving for more profitable alternatives. Programs for the development of livelihood enterprises have primarily the reduction of poverty as its main objective and seek to upgrade the productivity. The objective of growth enterprises is towards the development of an enterprise and uplifting it to a higher level of operationality as well as making it a firm sustainable business model. Also, the business looks to provide a comprehensive range of services, including technical assistance and credit (Hamad and Adeyemi, 2021).

Table 1: Comparison between livelihood and growth enterprises.

Livelihood Enterprises	Growth enterprises
Part-time or seasonal enterprise to supplement income	Enterprise is main source of income
Involves rudimentary skills	Entrepreneur requires considerable skills and expertise
Surplus earnings are limited	Enterprise is mostly in a niche-market and has earnings to invest back into the business
High proportion is in livestock, backyard poultry and food processing	Most are in technologically or service-oriented businesses

Source: (Hamad and Adeyemi, 2021)

While both types of enterprise are helpful for poverty alleviation, there are considerable differences between those two (Table *1*). Growth enterprises are typically more sustainable and help in the growth of productivity as compared to livelihood enterprises. Islamic microfinance places a strong emphasis on mutual benefit and collaboration when dealing with entrepreneurs and conventional banks and financial institutions will rarely provide financing to new entrepreneurs that lack sufficient collateral (Antova and Tayachi, 2019). In the case of Islamic microfinancing, the collaborative effort between the lender and loan taker is a key to success and leads to sincere interest of the lender in the success of the business (Antova and Tayachi, 2019).

A major question arises in what kind of microfinance models are most beneficial. These institutions provide financial services that are focusing on the poor entrepreneurs that are fitted to their needs. The quality of the microfinance programs depends on how streamlined the borrowing process is, and how quick the loans are disbursed (Beegle and Christiaensen, 2019). Microfinance institutions have a particular strong niche market in overcoming some of the challenges related from individual collateral and form groups of individuals in order to access funding. This sharing of risk within the group as well as finding consensus is at the core of Islamic finance (Adamu, 2018). This implies that the repayment of the loans is the responsibility of the entire group which implies that if one individual defaults, it affects the credit score of the entire group (Baber, 2019). The peer pressure that arises from the joint risk sharing allows the group to overcome financial challenges jointly and avoid delinquency. In most instances, such microfinance programs are structured in the form of providing small credit amounts and have weekly repayment intervals (Fersi and Bougelbène, 2021). Furthermore, the overall duration of the microfinance program is short in comparison to conventional loans that may range over 20 or 30 years. The most famous model relating to this form of microfinancing is the Grameen Bank model. The model necessitates the careful targeting of the poor and requires extensive fieldwork by the staff. The groups typically consist of five members, that each other guarantee the loan (Baber, 2019). Considering the benevolence of Islamic finance, the model may be easily adapted to comply with *Shariah*. Another model is the Village bank model that establishes a local bank which is financed via external capital (Malim and Normalini, 2018). Any individual loans are paid on a weekly interval and the individual village bank then returns capital gradually to the agency implementing it. If the loans are paid by bank in full, then the bank is eligible for subsequent loans. This takes on the form of joint risk taking by the villagers and potential mutual support as the default of a loan would hamper the ability to receive further financing. *Shariah* compliance can be easily realized in many different forms and the benefit of the bank is that it may become after a certain period of time autonomous and self-sustaining (Schuster, 2021). Additional models may be the formation of a credit union, or in the form of a self-help group. The most promising model to be implemented in Islamic finance is the village bank model, as it allows to establish an institution that may serve the community over a long period of time and may provide services beyond the loan financing (Mahadi et al., 2019). Furthermore, institutionalization of the loan process makes it easier to ensure that Islamic finance provisions are followed, and the bank will be more efficiently integrated into the existing financial ecosystem.

When developing these financial solutions, it is key to understand that poor people not only need loans, but a variety of financial services, such as insurance, savings accounts and money transfer options. Providing poor people with such access is a key to alleviate poverty and enables them to build wealth and prosperity (Mahadi et al., 2019). Furthermore, the microfinance financial system needs to be integrated into mainstream financial ecosystem, as well as ensure that these institutions are available over the long run. Technological challenges and cost of transactions and integration are major hindrances for these institutions to remain economically viable.

This outlines the challenges with conventional microfinancing where transaction costs are rather high. This is, both for conventional as well as Islamic microfinance options a key factor which reduces the impact microfinancing may have on lifting individuals out of poverty as well as providing financial service opportunities.

1.2 Blockchain – revolution for the integration

Blockchain technology has been rapidly attracting interest from various Islamic countries and also the Organization of Islamic Cooperation (OIC). Crucial to note is that blockchain should not be equated to cryptocurrencies that have received mixed reception in terms of their permission to be utilized under *Shariah* Law. Blockchain technology has experienced growing utilization with many Islamic financial institutions implementing blockchain systems in order to make transactions faster and more efficient as well as derive the benefits associated from this technology (Kemmoe et al., 2020). Blockchain allows to build distributed and tamperproof ledgers which reduces the need for intermediaries, reduces the cost and finally increases both speed and reach. Another benefit is that blockchain technology increases transparency overall and allows to better trace business processes. For the Islamic financial system, blockchain technology may have considerable benefits, especially when it comes to Islamic microfinances. The first major benefit is that the transaction cost can be considerably reduced. Given that blockchain utilized a decentralized storage of data, individuals may just utilize their mobile phones in order to conduct payments as well as receive their funds. Smartphone penetration is high in most developing countries due to the availability of cheap smartphones and access to the internet via these smartphones. In contrast to more developed countries, many individuals and family do not possess a computer, which makes smartphones the primary form in which individuals conduct their transactions and do their financial business. Furthermore, blockchain technology supports complex financing terms, *Shariah*-compliant transactions and also support *Shariah*-compliant alternatives to conventional insurance.

The main benefits of blockchain are its transparency, control, security and real-time information (Chang et al., 2020). Transparency is a key parameter as it allows to trace transactions easily and also ensures that the transaction is legitimate and was really executed. Furthermore, the network access can be easily controlled and restricted which allows it to restrict the utilization of the blockchain to specific identified users. A major benefit of block is that the digital ledger cannot be altered, nor can data be changed as soon as they are entered. This reduces the risk of fraud as any attempted modifications can be determined and would require a substantial control of the blockchain. Finally, the information is available in real-time as the blockchain is updated for everyone simultaneously (Kemmoe et al., 2020).

These benefits will potentially and significantly reduce the cost associated with Islamic finance, given the higher cost associated with the back-end processing of Islamic finance companies. The main challenge that arises is the current lack of regulations for smart contracts and the missing of a global regulatory framework for these contracts. We present an innovative blockchain framework for Islamic microfinancing. The framework allows to utilize blockchain cost-effectively and efficiently to enable Islamic microfinancing, and also integrates advanced AI analytics to enhance allocation of financial credit and optimize the offering of financial services.

2. Literature Review

Blockchain and AI have gained considerable prominence in recent years. Blockchain has been posited as a game changer in decentralizing and democratizing the financial system not needing anymore a central authority to move the funds in between. AI has likewise found growing adoption in the microfinance industry in order to more efficiently allocate loans and provide financial services.

Lalitha and Soujanya (2019) present a sample blockchain framework for microfinance institution for conventional microfinance in India. The outline of blockchain is conceptual and addresses some of the basic factors of blockchain being utilized as the general ledger for replacing the general ledger of the bank. The authors primarily focus on the immutability of the blockchain transactions as the main benefit to prevent fraud, which is a considerable benefit of blockchain technology (Lalitha and Soujanya, 2019).

Mukkamala et. al. (2018) provides an overview of how blockchain may be utilized for general social businesses. The review article outlines how a native cryptocurrency for such businesses may be developed, as well as the existing barriers in terms of infrastructure and technology that need to be overcome (Mukkamala et al., 2018). A particular focus of the article was on outlining the ability to strengthen trust into the social business and increase transparency. The authors presented several situations in which this may be beneficial and enhance efficiency and transparency.

Kshetri (2017) investigated whether blockchain may provide opportunities for major economic, political and social transformations in countries south of the hemisphere that are plagued by poverty and societal upheaval. Blockchain may bring with its transparency and trust, as well as ease of use an opportunity to enhance decision making, reduce fraud and increase trust in procedures (Kshetri, 2017).

Seyedsayamdost and Vanderwal (2020) investigated whether blockchain has a good societal impact and can assist in solving some of the global challenges. Based on the examination of three projects that have utilized distributed ledger technology, the authors outlined limitations with DLT solutions and provides policy recommendations (Seyedsayamdost and Vanderwal, 2020). The three projects analyzed include the cash transfer in Syria based on the World Food Programme, the illegal child trafficking in Moldova by the United Nations Office for Project Services and microlending to social enterprises in Brazil instituted by Moeda. The challenge of all these projects were that the distributed ledger technology was not utilized in its full form, but rather conventional intermediaries were replaced with those providing the blockchain technology. This implied the limitations that reduced the impact of the solutions and limited the potential deployment of these technologies.

Kunhibava et al. (2021) presented a comprehensive overview on the utilization of blockchain for *sukuk*. The authors concluded that the structuring of *sukuk* on blockchain can increase the transparency of the underlying assets and cash flows, in addition to reducing cost (Kunhibava et al., 2021). Furthermore, the number intermediaries and contract formalities may be significantly reduced, which would enhance efficiency in *sukuk* transactions.

Younas and Kalimuthu (2021) focused on analyzing the difference in growth between commercial banks and microfinance, specifically electronic monetary institutions that provide most of their services on mobile phones. This has necessarily led to a challenge to commercial banks facing new competition (Younas and Kalimuthu, 2021). The study shed light on the challenges of commercial banks that are likewise applicable to conventional microfinance institutions, and how mobile based solutions may provide an essential technological advantage to make it easier for individuals to deposit their money as well as acquire financing.

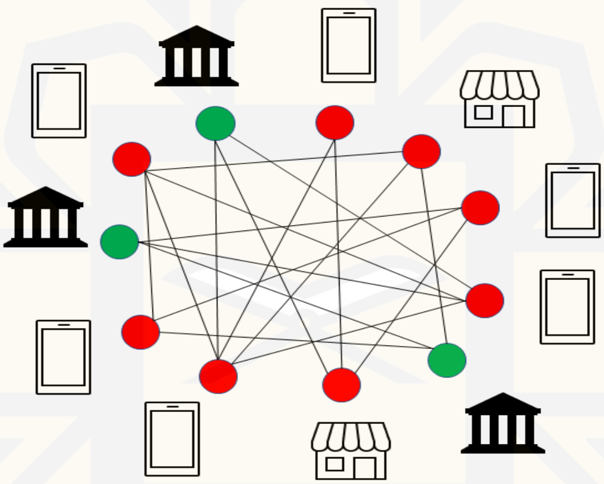
The presented research has outlined some significant progress in the area of how blockchain can be utilized for Islamic microfinancing. However, there is still significant uncertainty arising from how AI combined with advanced blockchain solutions can assist Islamic microfinancing in becoming more efficient, reach a wider target audience and make a significant contribution to alleviating poverty and providing financial services to the poor.

3. Conceptual Framework

We have developed a new AI – blockchain framework for Islamic microfinancing. The framework consists of a blockchain transaction ledger that records any interactions between the Islamic microfinance institutions and the individuals, providing both loan and other financial services, such as checking and savings accounts. The framework incorporates a blockchain that acts as the decentralized ledger allowing to add blocks of transaction and other information to block, making this immutable (Zahid et al., 2018). Furthermore, the blockchain also powers the transactions of the microfinance institution and enables via a mobile phone application to perform all its transactions, take out loans and perform refinancing. Furthermore, the e-wallet also provides the community with a payment platform, allowing them to pay easily with their mobile phone at various vendors, as well as receive their payments via the platform. The framework is illustrated in Figure 1 and consists of various members of the network. The blockchain distinguishes between validator nodes that can add members, validate the transactions and have primary control of blockchain, and the member nodes that can solely conduct or receive transactions. The validator nodes are the individual Islamic microfinance institutions that provide the financial services to the members, and the member nodes represent either businesses or Islamic microfinance members. Member nodes can only initiate or receive transactions, which is essential in order to avoid that member validate their own transactions, which may be subject to fraudulent activities. Maintaining the trust and oversight of the Islamic microfinance members is a key objective of the framework, as it ensures that the Islamic microfinance institutions can invalidate members in case they default as well as maintain control over the blockchain transactions. While modern cryptocurrencies pride themselves with the decentralized nature, challenges arise from ensuring that the transactions on the blockchain are legitimate and for *Shariah* compliant transactions. Recent years have demonstrated that bitcoin and other cryptocurrencies have been prone for being utilized by criminal networks and for illegal activities. Ensuring that such transactions are prevented, and only legitimate transactions can be carried out is paramount in order to maintain the public trust into the framework. Therefore, a validator node is essential in order to police the blockchain framework. Furthermore, the validating institutions allow them to control the members of the blockchain as well as remove any individuals that violate the established blockchain framework rules. This ensures a powerful enforcement mechanism, as any violators may face being excluded from the framework.

The framework was developed in Python and features both an integrated blockchain environment as well as optimized loan and financial services provisioning to the individual Islamic microfinance members.

Figure 1: Graphical illustration of blockchain architecture for Islamic microfinancing. The nodes in green are validator nodes, and the nodes in red are member nodes that can initiate or receive transactions.



4. Results and Discussion

In order to demonstrate the Blockchain AI framework on microfinancing, we utilized a dataset of approximately 40,000 members of an Islamic microfinancing institution in the Central African Republic which may utilize blockchain to be the ledger for their transactions. The dataset was augmented with data based on general demographic, income and societal norms if the data was not complete. The reference data were taken from a variety of sources, such as European Country of Origin Information Network, World Bank, International Monetary Fund, and the United Nations statistics (Austrian Red Cross, 2019; Kouame et al., 2020).

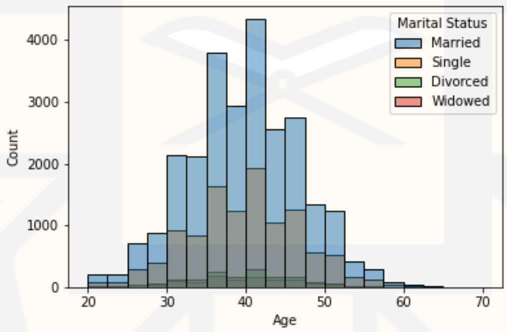
Table 2: Dataset parameters categorized according to personal data, Islamic values and financial data.

Data Columns	Type
Gender	Personal Data
Age	
Job	
Marital Status	
Number Children	
Wife is working	
Number of mobile phones	
Number of children studying	
Knows Blockchain	
Zakat Amount Paid per Year	Islamic values
Participates in Islamic volunteering	
Committed crimes	
Number of crimes committed	

Went to Islamic school?	
Number of financial services	**Financial Data**
Monthly Salary	
Monthly Overall Income	
Monthly Loan repayment	
Monthly expenditure	
Number successfully repaid loans	
Number defaulted loans	
Value of collateral	
Expected Annual Transaction Volume	

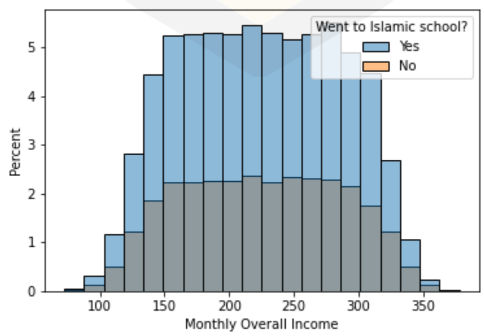
For the blockchain-AI framework, we analyzed initially the dataset to discern potential correlations and relationships within the data in order to optimize the provisioning of financial services and loans. The collected data for each individual member is outlined in Table 2. The collected data were categorized into three different types; personal data, data related to Islamic values and financial data. When analyzing the factors impacting Islamic microfinancing eligibility, personal factors as well as financial conditions are the most important decision-making variables. These are also the key parameters when analyzing expected volumes of transactions that will be conducted via the blockchain framework, allowing to provide targeted offers to the members. In Figure 2, we outline the age distribution in the dataset, as well as the marital status. The distribution indicates that most of the applicants were married with a few being single, and a lesser number being divorced or widowed. This is expected given that societal norms and family relationships play a critical role within the society, encouraging individuals to get married and have children.

Figure 2: Histogram of the age distribution and marital status



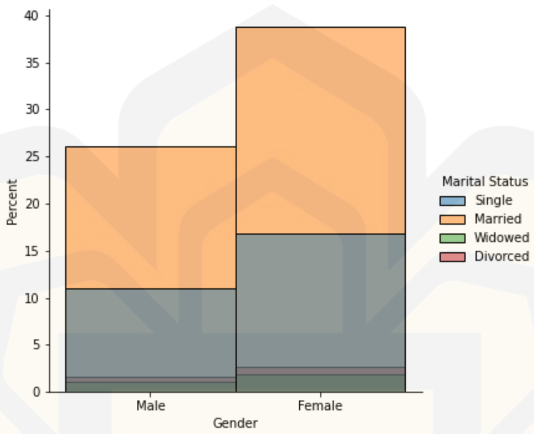
Another keen interest was the determination whether the attendance of an Islamic school affected the overall income of the individuals. Based on the distribution and a statistical analysis, there was no clear indication that this is really observable within the data.

Figure 3: Histogram comparison of monthly overall income versus attendance of Islamic school



In order to understand gender induced effects on the marital status, we visualize the distribution of the data in Figure 4 their distribution and color each by their marital status. The data outline that almost 38 percent of the women are married, while around 17 percent are single. The overall statistics outlines that the dataset contains more women as compared to men in the dataset. Given that normal income of men is typically higher than for women, with many Islamic micro financed businesses primarily being run by women, this is mirrored in the dataset.

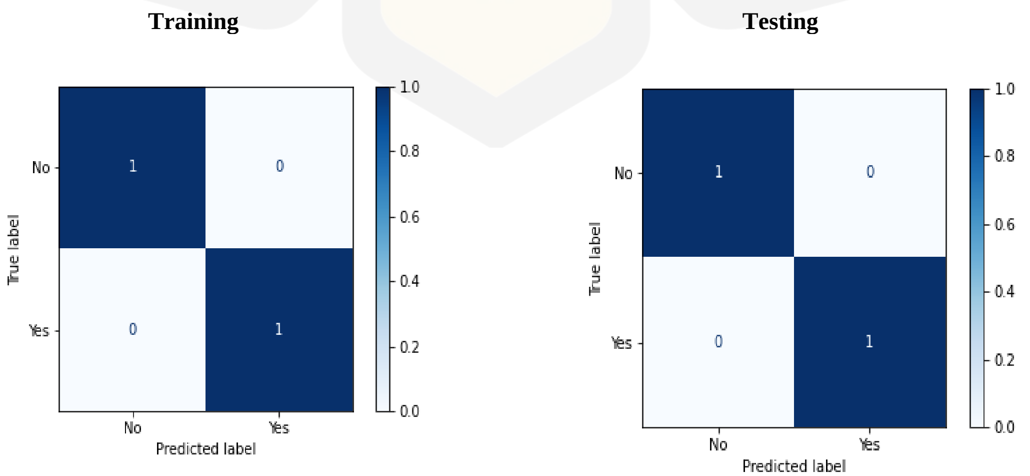
Figure 4: Comparison of distribution of male and female according to their marriage status



Having analyzed the data, we then aimed at developing a data-driven framework to optimize the allocation of Islamic microfinance capital within the community based on the blockchain transaction framework. A key objective of the framework is to provide in real-time whether an individual is qualified to obtain Islamic microfinancing services or not. Furthermore, the maximum loan amount that can lead to reliable repayment will also be determined. Additionally, the credit risk is going to be evaluated addressing both the risk of potential default and financial engagement.

In order to evaluate the performance of the framework for the loan qualification of individuals, we performed a confusion matrix comparison. The framework performs both on the training and testing dataset well, achieving perfect accuracy scores (Figure 5). This strong estimation performance is due to a variety of reasons. The first reason is that there is strong correlation between the monthly income, and collateral value in determining the qualification for financial services. Higher income individuals with sufficient collateral qualify easily for an Islamic microfinance loan due to the increased likelihood of them being able to pay back the loan. Furthermore, the criminality of the individual may also impact the estimates significantly.

Figure 5: Confusion Matrix plot for the qualification of individuals for an Islamic microfinance loan

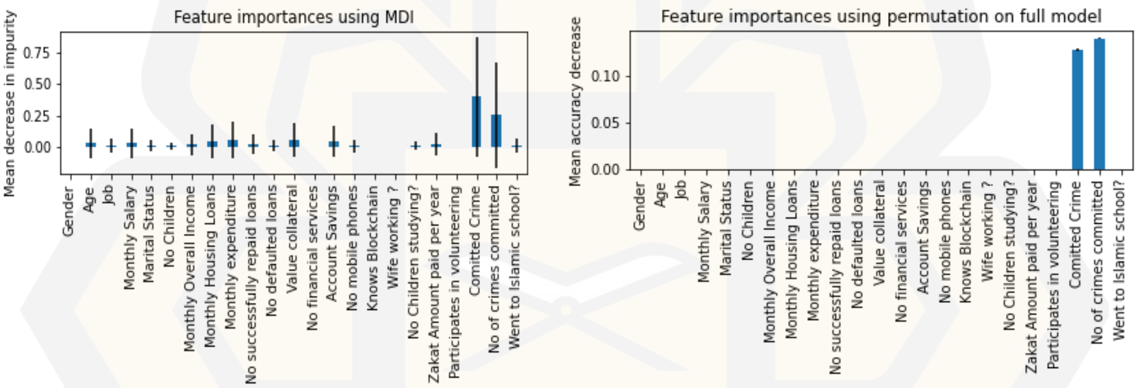


In order to evaluate which features have the strongest impact on the estimation, we determined the feature importance based on mean decrease in impurity and feature permutation. Determining the feature importance based on the mean decrease in impurity calculates both the mean and standard deviation of the accumulation of the impurity decrease within each of the trees, and then both the mean and the standard deviation are used to measure the impact. For the determination of the feature importance based on permutation, these features are computed based on left-out test set and have the advantage that they are less susceptible to a bias towards high cardinality features.

In order to ensure robust feature importance calculations, we compared the results for both versions and displayed the results in Figure 6. The results clearly indicate that the number of crimes and whether a crime was committed are the most essential features determining whether someone qualifies for a loan or not. This is a key pillar in Islamic finance to observe the deeds of the individual, especially when it comes to following the commands of Allah to be law-abiding and support the society.

Figure 6: Feature importance for both mean decrease in impurity, and feature permutation for the qualification of individuals for an Islamic microfinance loan

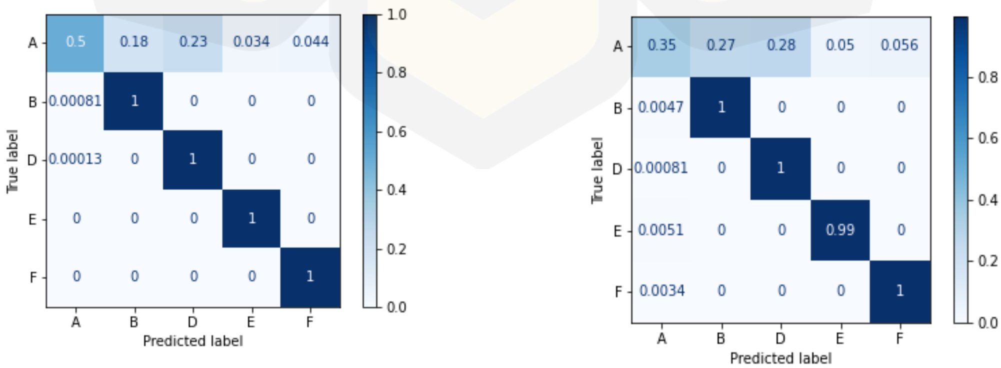
MDI **Feature Permutation**



Based on the qualification for loans, we then evaluated the credit risk for the individual Islamic finance loan takers. The credit default risk was categorized into five categories ranging from very low risk (A) to high and severe risk (F). We display in Figure 7 the confusion matrix for both the training and testing dataset. The credit default risks are well determined with highly correct classification for both the training and testing dataset.

Figure 7: Confusion Matrix plot for the credit default risk of individuals for an Islamic microfinance loan

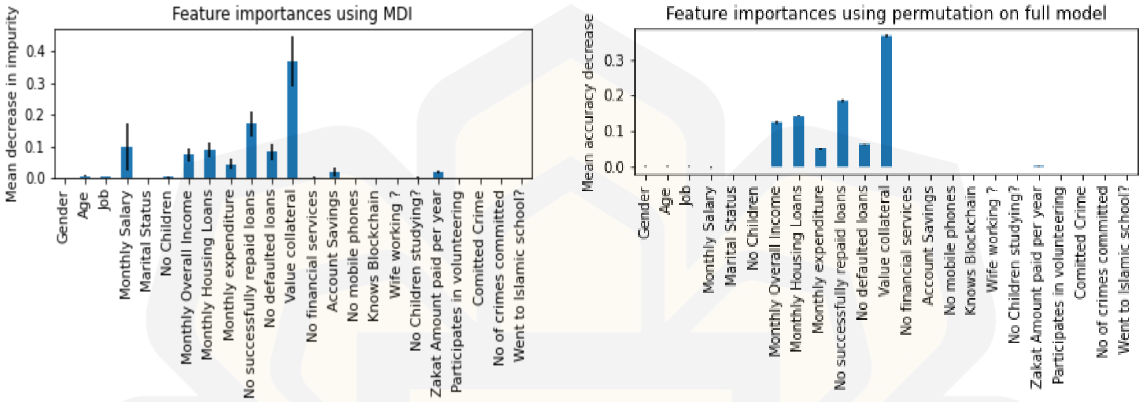
Training **Testing**



In order to evaluate the feature importance impact on the various risk categories (Figure 8), we can observe that the value of the collateral is one of the most crucial parameters, next to the number of successfully repaid loans. These results agree with the focus of Islamic microfinancing to ensure honesty and have the loans backed by adequate collateral.

Figure 8: Feature importance for both mean decrease in impurity, and feature permutation for the credit default risk for an Islamic microfinance loan

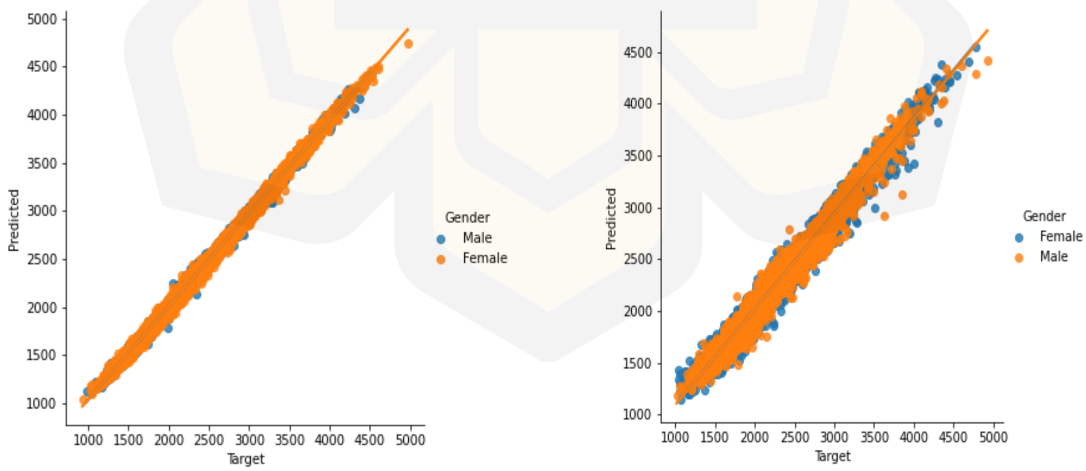
MDI **Feature Permutation**



In order to estimate the maximum that an individual can loan, we developed a random forest framework for the estimation of the maximum loan amount. The estimation results for the training and testing dataset are presented in Figure 9, outlining target vs predicted maximum loan amounts. Both results outline strong estimation results with the coefficient of determination being 0.9 and 0.85 respectively. A comparison in terms of male versus female indicates that the framework is sufficiently capable of determining accurately the maximum loan amount that is reasonable for the microfinancing loan.

Figure 9: Regression plot for the maximum number of individuals for an Islamic microfinance loan

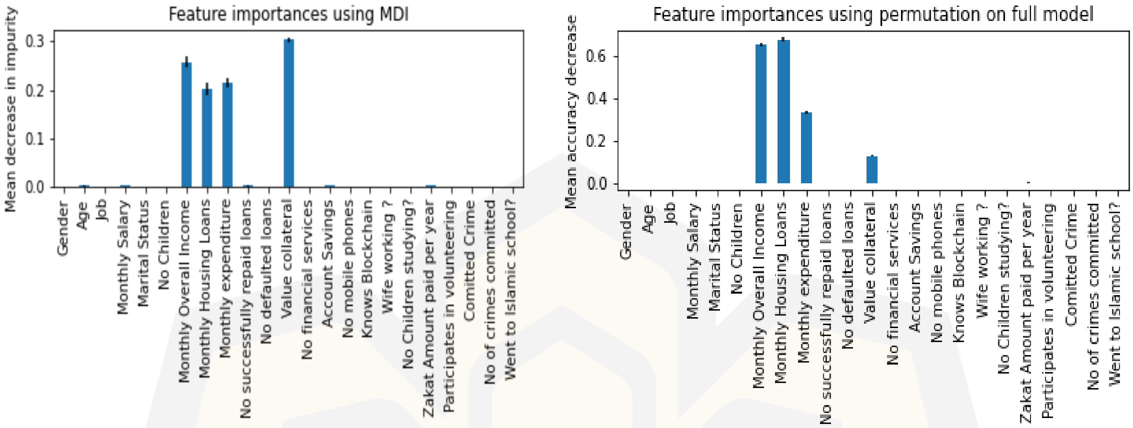
Training **Testing**



Finally, we investigate in Figure 10 the feature importance for the determination of the maximum loan amount. The results clearly indicate the collateral value, monthly overall income and expenditures are the key criteria determining the overall amount to be loaned. Interestingly is the difference between the MDI and feature importance based on permutation, where overall monthly income and housing loans represent the most important features.

Figure 10: Feature importance for both mean decrease in impurity, and feature permutation for the maximum loan value for an Islamic microfinance loan

MDI **Feature Permutation**



In order to evaluate the expected annual transaction volume of the individuals with respect to the utilization of the blockchain, we illustrate in Figure 11 and Figure 12 the regression plots and feature importance analysis for the expected annual transaction volume that outline strong estimation performance. A key factor determining the annual transaction volume is monthly income. Furthermore, expenditures related to housing and overall living cost represent key parameters for the determination of how intensive and widely used the framework will be. The estimates are critical as it allows to provide differentiated services to members and address their Islamic finance needs.

Figure 11: Regression plot for the expected annual transaction volume of members of the Islamic microfinance institution

Training **Testing**

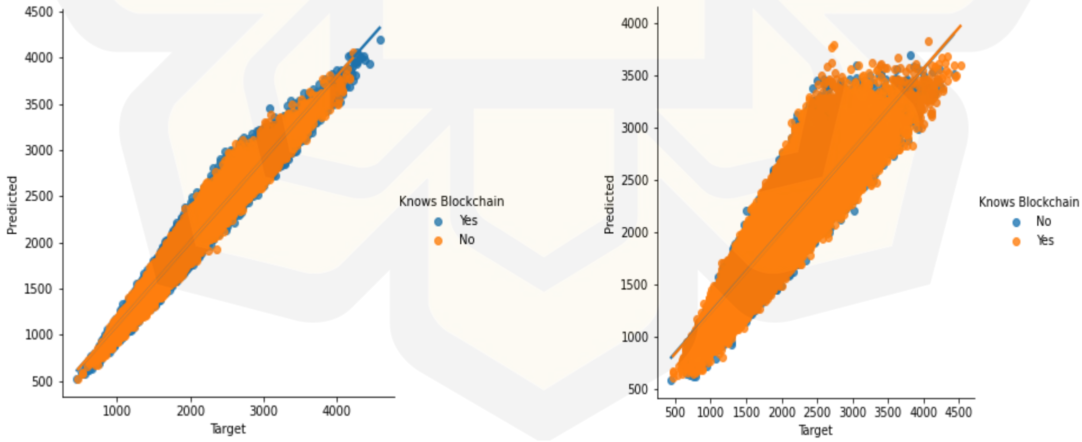
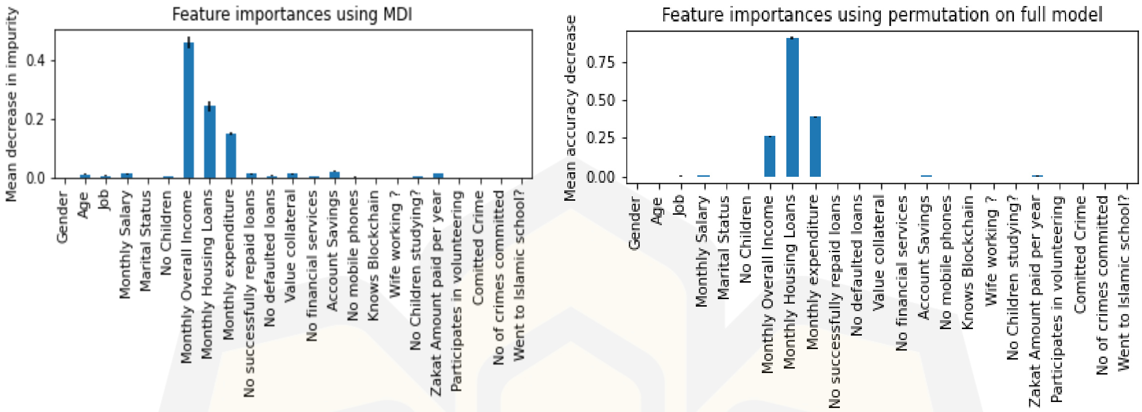


Figure 12: Feature importance for both mean decrease in impurity, and feature permutation for the expected annual transaction volume

MDI **Feature Permutation**



5. Conclusion and Recommendation

We have demonstrated a novel AI blockchain framework for enhancing Islamic microfinancing. The framework incorporates both a blockchain framework for the recording of transactions and to increase efficiency of the Islamic microfinance transactions, in addition to an AI framework that allows to enhance decision making for individual members. The framework was evaluated on large dataset from the Central African Republic outlining its ability to improve efficiency of Islamic microfinance transactions and provide more targeted services depending on the characteristics of the member. This framework may be utilized by Islamic microfinance institutions to assess the risk of microfinance loans efficiently and robustly, allowing for an informed risk management decision.

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COVID-19 on Performance of Islamic Banks in Fintech and Digitalization Era

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Abstract

This study attempts to provide insight on risk and opportunities for Islamic banks arising from COVID-19 pandemic by using document analysis approach. The COVID-19 pandemic has increased banking risk. The paper emphasizes the impact of the crisis on credit risk as historically thought as the most significant risk driver. Increased credit risk in Islamic financial institutions (IFIs) is due to broad-based deterioration of economic conditions affecting multiple sectors, resulting in a general increase of non-performing financing (NPF) balances and charge-offs. Further, it was found that banks have suffered more not only relative to other sectors, but also in comparison with previous crises. In addition, some authors observe that banks that had entered the crisis with the highest level of credit risk, measured in terms of credit default swap (CDS) spreads rise, were most hit. On the other hand, the pandemic has proved beyond doubt the value of digital services that minimize or eliminate direct human contact. The power of digitalization can facilitate outreach to even the most vulnerable population. Islamic financial institutions may seize this opportunity to expedite the digitalization of their operations either using their own resource or by joint venturing with technology companies.

Keywords: Islamic banking, COVID-19, credit risk, fintech

1. Introduction

The aim of the study is to analyze the risk faced by Islamic banks due to COVID-19 pandemic with a special attention on credit risk, and at the same time to identify opportunities in fintech technologies for to overcome them. It reviews the Islamic banking landscape, fintech implementations, up-to-date literature and dives into analysis based on the literature review findings and financial data from some of the largest Islamic banks (Maybank Group, Malaysia; Al Baraka banking Group, Bahrain). It stresses the importance of incorporation of fintech-based solutions (blockchain, artificial intelligence, and big data analytics) not only for the Islamic banks to overcome the COVID-19 negative impact, but also for to improve credit risk management and reach the unbanked population and unserved companies.

1.1. Islamic banking landscape review

The total worth of the Islamic financial services industry (IFSI) across its three main segments depicted in Figure 1 (banking, capital markets: *sukuk* and Islamic funds, and *takaful*) has been historically estimated at USD 2.44 trillion in 2019 (IFSB, 2020), with 72.40% comprised by Islamic banking assets.

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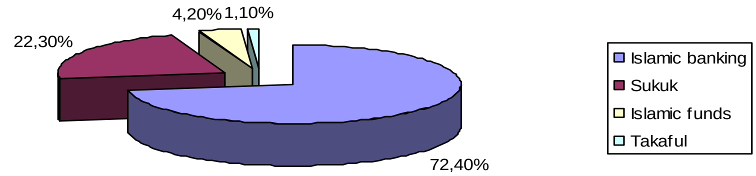
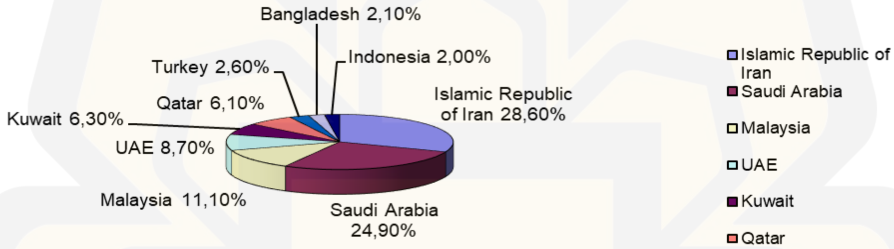
Figure 1: Segmental Composition of the Global IFSI 2019



Source: IFSB (2020)

92.40% of the global banking assets are situated in nine countries: Islamic Republic of Iran, Kingdom of Saudi Arabia (KSA), Malaysia, United Arab Emirates (UAE), Kuwait, Qatar, Turkey, Bangladesh and Indonesia presented with their percentage share in Figure 2.

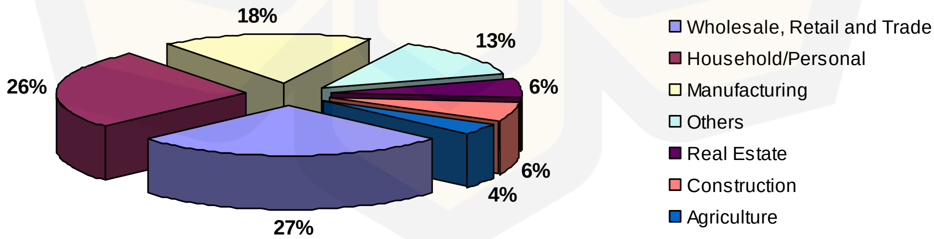
Figure 2: Share of Global Islamic Banking Assets % (3Q19)



Source: IFSB (2020)

As per Islamic Financial Services Board (IFSB) Stability Report 2020 wholesale, retail and trade, and household sectors received 27% and 26% of the total financing in 2019; followed by manufacturing 18%, real estate and construction each 6% and agriculture 4% presented as weighted average in Figure 3. The sectoral composition of financing varies greatly between countries and regions, and it is given for illustrative purpose only. For instance, Malaysian household sector received 60.9%, Saudi Arabian household sector 43.2% and 53.1% in UAE. Further, real estate in Indonesia received 27.8%, and manufacturing sector in Bangladesh received 39.4% (IFSB, 2020).

Figure 3: Financing Exposures of Islamic banks to the Real Sector



Source: IFSB (2020)

As per IFSB (2020), Islamic financial institutions, due to their high exposure to the real economy (87% of total financing for 3Q 2019, presented in Figure 3) are expected to record declined revenue, high pressure on earnings and lower year-over-year growth in 2020 especially as focus will be on preserving asset quality at the expense of business growth. Due to the increased risk from COVID-19 pandemic, it is expected a decline in profitability of Islamic banks, which could be further intensified due to provisions and write downs. Increased pressure on liquidity could also be expected due to the mandatory postponement of repayment of existing financing extended to small and medium enterprises (SMEs) and households in many jurisdictions with Islamic banking activity.

In light of the pandemic crisis to support liquidity, Saudi Arabian Monetary Authority in Arabian Business (2018) is providing guarantees on SME, where Bank Negara Malaysia is allowing Islamic banks to operate below the minimum liquidity coverage ratio (LCR) and net stable funding ratio (NSFR). The following Table 1 reports actions taken by central banks in the selected countries (depicted in Figure 2) with significant market share of Islamic banking in response to the pandemic crisis. As shown from the Table the authorities in all nine countries are providing relief package for instant relief on borrowers: households and businesses. Except the central bank in Bangladesh, all other authorities provided policy rate cut. In addition, except the central bank in Kuwait, all other central banks included measure on supporting or increasing lending to the private sector. This measure is extremely important for Malaysia, where household sector received 60.9% of the total financing in 2019. Malaysian central bank (Bank Negara Malaysia) and Iranian central bank have introduced only four of the ten measures provided in Table 1. Further, only two central banks implemented foreign exchange policy (KSA; and Indonesia).

Table 1: Central Banks and Supervisory Authorities on COVID-19 Measures

Measure	Iran	KSA	Malaysia	UAE	Kuwait	Qatar	Turkey	Bangladesh	Indonesia
Policy rate cut	√	√	√	√	√	√	√		√
Financing & refinancing facility			√	√	√	√	√	√	
Deferment and restructuring of loans	√	√		√		√	√	√	
Promote digital payments		√			√				√
Foreign exchange policy		√							√
Banking services ease		√			√			√	√
Increasing/supporting lending to the private sector	√	√	√	√		√	√	√	√
Facilitate export-import sectors					√		√	√	√
Relief package for households and businesses (SME, corporate etc.)	√	√	√	√	√	√	√	√	√
Islamic Banking related measures					√			√	

Source: IRTI 2020 Excerpt

1.2 Review of up-to-date fintech implementations

Fintech could change traditional banking business models and operations through lowering barriers of entry to the financial services market and transforming the role of data as a key commodity. Further, the young global Muslim population can be seen as a key driver for Islamic fintech. Another key area of opportunity is the role of the multibillion-dollar Islamic social finance pools from charity, and endowments (World Bank, 2020).

Some of the fintech initiatives of the member countries of Organization of Islamic Cooperation (OIC) are presented in Table 2. Around 33% of startups fintech companies are based in Indonesia, which has the world's largest Muslim population, followed by UAE and Malaysia (DinarStandard, 2018).

Table 2: Selected OIC Initiatives

Country	Organization	Description
UAE	Dubai International Finance Center	Dubai International Financial Centre (DIFC), a leading international financial hub announced a $100 million FinTech-focused fund to invest in Fintech start-ups from incubation through to growth stage.
Malaysia	Malaysia Digital Economy Corporation	MDEC is a government-owned entity responsible for developing Malaysia's digital business ecosystem. The organization also actively supports halal economy businesses by providing shariah certification and providing a network and link to venture capital investors.
Bahrain	Bahrain Fintech Bay	Bahrain's Fintech Bay is a dedicated co-working space dedicated to attract and develop Fintech and particularly works with Islamic Fintechs in partnership with leading Islamic finance institutions that operate in Bahrain and across the GCC.
Indonesia	Financial Services Authority (OJK)	While startups are driving Islamic fintech growth in Indonesia Government agencies are realizing their impact and starting to facilitate. The Financial Services Authority (OJK), has established a regulatory framework for P2P lending platforms.
Other	UK, Kazakhstan, IDB, Saudi Arabia	UK regulators have been supportive of its domestic Islamic Fintech Panel and startup ecosystem. The launch of Astana International Financial Center is also seeking to develop Islamic finance and fintech. Similarly, Saudi Arabian Monetary Authority has recently launched FintechSaudi. Finally, the multi-lateral Islamic Development Bank has launched a Fintech Challenge supporting Islamic Fintech startups

Source: DinarStandard (2018)

Table 3 presented core fintech technologies that deliver key end-customer financial services and back-office operational support/efficiencies along with examples of service providers.

Table 3: Core Fintech Technologies

Fintech Technologies	Fintech Challenger Examples	Incumbent Examples
Artificial Intelligence	Lemonade, a new York-based insurance startup, has automated the claims process, removing the cumbersome task of filling claim forms, by making a transaction bot takeover all the claim cycles	Sun Life created a virtual assitant, Elia, to send reminders to users regarding their insurance or pension plans
Big Data Analytics	Hexanika is a data management and reporting solution for financial institutions. Their software uses an algorithm that can source and ingest data in multiple formats to normalize datasets. It aims to cut regulatory costs and avoid non-compliance.	Standard Chartered has developed its big data analytics, resulting in an enhanced user experience

Quantum Computing	QuintessenceLabs has created a set of data technology products and solutions based on quantum computing technology to enable secure data transfer and storage.	Deutsche Bank Securities partnered with D-Wave Systems to develop "Quantum for Quants"
Mobile Payment	N26 is a licensed startup bank based in Germany that has gained 2.3 million retail customers in 4 years. Products include Google Pay and connected debit card by Mastercard.	BTPN Bank in Indonesia has issued "Jenius" to open accounts and make deposits and payments.
Open Banking	Enfuce is developing a connectivity layer that enables third parties to communicate with banks for data as well as payments.	Customers of Lloyds Bank, Halifax and Bank of Scotland apps have the ability to view their bank accounts from these banks through an app.
P2P Finance	ThinCats Australia aims to link investors to debtors throughout the country and offers financing between 2 and 3 years, with no concealed fees or repayment charges.	Barclays acquired RainFin in South Africa to tap into P2P financing.
Distributed Ledger (Blockchain)	Symbiont is a blockchain company developing products in smart contracts and distributed ledgers for capital markets.	Barclays and Citi work with IBM to create LedgerConnect a proof of concept for distributed ledger technology.
Cloud Adpotion	Stripe valued at a massive USD 20 billion, enables small businesses to recognize payments online without payment fraud.	ICICI Bank in India uses Microsoft Azure to work with some applications without having physical servers on its premises.
Cybersecurity	ComplyAdvantage supports financial institutions to comply with current regulations in Anti-Money Laundering (AML), counter-terrorism financing (CFT), corruption, and bribery.	Monetary Authority of Singapore has offered USD 21.88 million in funds to help local financial institutions improve cybersecurity operations.

Source: World Bank (2020)

In addition, some of the successful implementations or projects going on in Islamic financial industry are presented below:

- The Central Bank of the United Arab Emirates (CBUAE) and the Saudi Central Bank (SAMA) (2020) have engaged into a project for issuing digital currency to facilitate a cross-border payment system that will reduce costs and transfer time between banks in both states (Islamic Markets, 2020).
- Emirates NBD (Dubai, UAE) applies blockchain technology to improve security standards in banking, particularly to combat cheque-related fraud (Emirates NBD, 2018).
- Al Hilal Bank (Abu Dhabi, UAE) has used blockchain technology for the resale and settlement of a *sukuk*. The bank applied smart contracts to enhance the transactional efficiency (Al Hilal Bank, 2018).
- The Islamic Cooperation for the Development of the Private Sector (ICD) (Saudi Arabia) signed an agreement with I-FinTech Solutions (IFTS) (Tunisia) to develop a blockchain-based real-time transactional platform to facilitate commodity *murabahah* transactions to solve interbank issues in a *Shariah* compliant manner (Reuters, 2018).
- Islamic Development Bank (IsDB) used SettleMint platform for the tokenization of fiat currency, and to distribute the subsidies in a peer-to-peer manner. Using blockchain for a subsidy distribution allows for full control of spending at any time. The automation of the entire contractual process helps

reducing the administrative and legal complexities associated with *Shariah*-compliant financial products (SettleMint, 2019).

- Investment Account Platform (IAP) (Malaysia) is a cross-border multi-currency platform for facilitating financing opportunities for emerging business ventures (IAP, 2019).
- Bursa Suq Al-Sila (BSAS) (Malaysia) is a commodity trading platform specifically dedicated to facilitating Islamic liquidity management and financing by Islamic financial institutions (Bursa Malaysia, 2019).
- Emirates Islamic bank, HR Panda (UAE) an artificial intelligence assistant that can automate more than 50% of the bank's recruitment process, helping choose the right candidates for the right vacancies based on identifying the communication and soft skills of the candidates (MENA Herald, 2016).
- Brunei Darussalam's e-Darussalam Account is a single nationwide authentication key that is linked to an individual's National Identity (ID) number. This provides the fundamental prerequisite for a variety of fintech services including Electronic Know-Your-Customer (Government of Brunei Darussalam, 2020).

Further, examples per type of financial service are presented in Table 4.

Table 4: Islamic Fintech Examples per Type of Financial Service

Financial Services	Islamic Financial Services (Includes)	Islamic Fintech Examples
Funding	• Custody-based deposits (can also be based on *Qard*) • Investment accounts • *Shariah* –compliant payment, collection, and liquidity management	• PayHalal (Souqa Fintech Sdn Bhd, Malaysia) • AmalPay (Malaysia) • Investment Accounts Platform (IAP – Malaysia)
Trade Finance	• *Murabahah* working capital • *Murabahah/Wakala/Mudaraba*/Letter of Credit	• Waqfe – Bahrain (Digital banking platform provider)
Financing	• *Murabahah/ Mudarabah /Musharakah/ Salam/ Istisna'/ Ijarah* Financing • Islamic Microfinance	• Ethis Crowd – Singapore, Indonesia, Malaysia, Australia • Blossom Finance
Capital Markets	• Islamic Bank Treasury • *Sukuk* (Islamic Bonds)	• Adab Solution (Crypto exchange)
Wealth management	• Shariah – compliant wealth management for retail and HNWIs	• Wahed – US (Robo-advisory investment platform) • HelloGold (blockchain-based gold investment)
Insurance	• *Takaful* • Re-*Takaful*	• Uplift Mutuals • Insure Halal

Source: World Bank (2020)

2. Literature Review

2.1 Islamic banks' performance and COVID-19

The crisis occurring at the end of a global credit cycle, suppressed both supply and demand (Laurent et.al, 2020). Banks were found to suffer more not only relative to other sectors, but also in comparison with previous crises (Aldasoro et al., 2020). To deal with the crisis, central banks have announced several measures for liquidity support to the banking sector. These include (i) lowering reserve requirements, (ii) lowering of the regulatory capital buffer, (iii) bond/*sukuk* buying programs, and (iv) availability of central bank credit lines (reverse repo). This led to enormous fiscal difficulties and limited ability for further support of some countries with Islamic finance share (IsDB, 2020). In addition, IFIs have variable cost of funding, making them generally more vulnerable to a higher (nominal) cost of capital under monetary tightening (IMF, 2020).

As per KPMG (2018) the immediate issues that banks face on the main risk drivers, categorized as credit risk, market risk, operational risk and liquidity risk, due to COVID-19 pandemic are illustrated in Table 5 below.

Table 5: COVID-19 Implications on Financial Risks

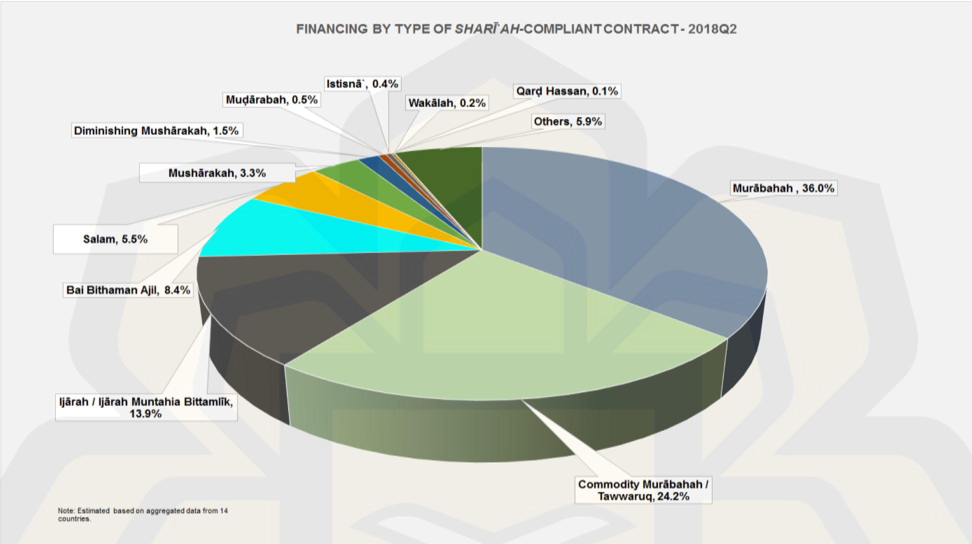
Credit risk
Obligors seeking liquidity and drawing down their credit facilities. Early warning systems and internal rating systems are downgrading credit, less sensitive ratings of larger companies may need manual analysis on cash flows and ad-hoc treatments. Portfolio early warning triggers: sectors like tourism, hotel, airlines, commodities, etc. will all be put on early warning lists that may have knock-on effects to ECL and RWA. Forbearance measures are requested: banks need to analyse obligor cash flows and process applications in a short period of time. Uncertainty about IFRS 9 stage 2 migration due to relief measures and interactions with SICR2 as well as challenges modelling economic scenarios (including which forward-looking scenarios and probabilities to be used). Default uncertainty about NPL identification, restructuring or recovery approaches.
Market risk
Market risk (general) High market volatility visible across all asset classes. Lower prices for bonds impact P&L and capital, especially liquidity reserve bonds. Limit breaches may occur due to higher exposures in the wake of rising market volatility and may arise due to inability to hedge certain exposures. Inconsistencies in market data due to loss of liquidity affecting valuations and risk model parametrisation. High volatility drives trading frequency and trading costs up, e.g., in delta hedge environments. *Market risk (Internal Model Approach)* New stressed scenarios drive VaR figures upward leading to increased RWAs. Back-testing outliers occur due to a series of strong market movements possibly leading to higher regulatory scaling factors and thus increased RWAs.
Operational risk
Uncertainties of COVID-19 impacts on operational processes putting strain on operational risks. Striking the right balance between cost cutting and smooth operations. Regulatory and business focus on operational resilience..
Liquidity risk
Underprepared for the unexpected liquidity constraints from heavy drawdowns and limited access to alternative funding sources Challenges on practicability and flexibility of existing stress testing and liquidity risk framework. Lack of ad-hoc assessments and effective escalation protocol (e.g., timely reporting and decision-making).

Source: KPMG (2020)

Historically, credit risk has been thought of as the most significant risk in banks. Credit risk is seen as the most important risk driver in Islamic financial institutions by IRTI & GARP (2015); Mokni et al (2015); Boumediene (2010); Abu Hussain and Al-Ajmi (2012); Al-Tamimi and Al- Mazrooei (2007); and Lassoued (2018). Further, Kabir et al. (2015), and Tafri et al. (2011) find that Islamic banks face higher risk than traditional banks, and that understanding and management of risk are much different from conventional ones in terms of credit risk identification and assessment (Noman et al., 2015).

Khan and Ahmed (2001) reveal the importance of credit risk as the main risk driver in *mudarabah*[1] and *musharakah*[2] contracts. Credit risk exposures in Islamic financing also arise in connection with accounts receivables in *murabahah*[3] contracts (comprising 36% of the financing for 2018Q2 as presented in Figure 4), default risk in *salam*[4] contracts, accounts receivable and default risk in *istisna'*[5] contracts, lease payments receivables in *ijarah*[6] contracts, and default risk in *sukuk* held in the banking book.

Figure 4: Financing by Type of Shariah-Compliant Contracts



Source : IFSB (2022)

Aldasoro et al. (2020) find that the banks that had entered the crisis with the highest level of credit risk, measured in terms of credit default swap (CDS) spreads rise, suffer the most. The CDS spreads of the riskiest banks continued to increase even through the stabilization phase. Dynamics, challenges and potential new approaches related to credit risk are presented in Table 6.

Table 6: Dynamics, Challenges and Potential New Approaches to Credit Risk

Dyamics/ Challenges	Changes in credit worthiness at sector and subsector level. Hard to differentiate between borrowers in the same sector or subsector. Pertinent data on crisis conditions are scarce, lagging, and not fed automatically to decision making. Socially responsible collections needed to meet changing customer preferences. A large wave of nonperforming exposures is beginning and must be addressed in new ways.
Potential new approaches	Analyze demand shocks and recovery trajectories and translate to probability-of-default multipliers. Go deeper in to borrower financials and business model to estimate resilience to COVID-19 crisis effects.

[1] *Mudarabah*: an agreement between IFI and its obligor where the IFI contributes a specified amount of capital funds to an enterprise or business activity that is to be managed by the obligor as an entrepreneur (*Mudarib*).
[2] *Musharakah*: an agreement between IFI and its obligor to contribute an agreed proportion of capital funds to an enterprise or to acquire ownership of an asset/real estate.
[3] *Murabahah*: a sale contract by which the owner of an asset or good sells it to a buyer at cost plus markup.
[4] *Salam*: is a forward sale of fungible commodities. The buyer fully prepays the price in return of receiving the object of sale at a certain specified future date.
[5] *Istisna'*: a forward sale contract whereby the buyer commissions the seller to manufacture a product according to certain specifications and quantities in return for an agreed price.
[6] *Ijarah* or leasing: the sale of usufruct of a particular property.

	Mine transaction data to derive cash flow, affordability; mine alternative high-frequency data to derive revenue trends; auto-feed results into decision engine. Shift to customer-assisstance interaction model and make it a priority in a digital transformation. Develop sector-specific solutions, augment capacity, and evaluate cost-benefit of organic versus inorganic options.

Source: Koulouridi et al. (2020)

Even though COVID-19 pandemic poses challenges on liquidity, resilience, and capital for the Islamic banking sector, the largest component of the Islamic financial industry (IsDB, 2020), Syed et al. (2020) find that Islamic finance has immense potential to fight any kind of situation/pandemic through *zakat* and *qardh-al-hasan*. Further, Islamic banks have resilience in withstanding the adverse consequences of economic crises (Mirzaei, 2021). In addition, Boubakri et al., (2017) report that healthier banks perform better during crises times.

2.2 Islamic banks and fintech

The biggest advantage of Islamic fintech is that it is transparent, accessible and easy to use (Laldin, 2018; Wintermeyer and Basit, 2017), whereas the biggest obstacle for developing the Islamic fintech has been the lack of clear policy from the government and well qualified human personnel (Rusydiana, 2018). The use of big data, machine learning, and blockchain in Islamic finance will bring more efficiency and transparency for IFIs, regulators, and consumers (Sun et al. 2020; Rabbani, 2020). The growing importance of artificial intelligence (AI) in finance could be summarized with the fact that JPMorgan Chase has more software developers than Google and more technologists than Microsoft (CA technologies, 2014). For example, AI is employed for automatic detection of suspicious loan applications during the loan application process (MyBucks, 2018). It also helps to prevent money laundering, and identify unusual activity (Cheung, 2020). Baber (2019) finds crowdfunding based services to have a positive impact on customer retention for Islamic banks operating in Malaysia and UAE. In addition, Islamic fintech can lead to higher customer loyalty (Aisyah, 2018) and increase in banking transactions and bank's financial resources (Shahabi et al., 2020).

3. Methodology

This study performs a descriptive qualitative analysis, by adopting a document reviewing approach and further analysing research results. The stages involve examining data, interpreting it to gain an in-depth understanding, obtaining the meaning contained and scientific development in research. The literature review data that were used for this study were taken from various sources (mainly using Google scholar search engine) including relevant journals, related books, newspapers originated from print and electronic media and scientific articles with main accent on publications in 2019 and 2020. The financial data provided for the selected Islamic banks (such as the Maybank Group, Malaysia; Al Baraka banking Group, Bahrain) is retrieved from their official annual reports and Basel II disclosures. An analytical procedure adopted in this study includes analysis, assessment and synthesis of the data contained in the documents. This research adopts the methodology of Rabbani et al. (2021) and stresses more attention on the practical implication of fintech in Islamic banking risk management.

4. Analysis and Findings

The full impact of the prolonged COVID-19 crisis has not been fully obeserved yet due to the wide-ranging policy measures (IFSB, 2021). IMF (2020) found Islamic banks to be vulnerable to three key transmission channels of negative shocks including: changes in pre-impairment income from financing activities; changes in asset quality and; changes in risk intensity resulting from higher unexpected losses.

As per Aldasoro et al. (2020) the pandemic crisis had the worst impact on the banks with highest credit risk. According to Arunkumar and Kotreshwar (2005) credit risk causes 70% of the total risk banks face while the other 30% is shared by market and operational risk. European Banking Authority for year 2018 reveals that credit risk and market risk amount on average 87.3% of risk weighted assets (RWA). The 2019 annual report for Maybank Islamic shows that 87.35% of the total RWA is credit risk's RWA. The same year annual report for Dubai Islamic bank reveals that 74.34% of Islamic financing (124.7 AED billion) for the group for 2019 is in *murabahah* (40.4 AED billion) and *ijarah*, excluding home finance *ijarah* (52.3 AED billion). The implementation of Artificial intelligence (AI) based solutions could help to provide non-linear, dynamic models for better assessment of credit risk and help to increase banking lending portfolio fully leveraging AI. In addition, the implemantion of blockchain based solutions could help to automate entire contractual process, to alleviate the additional administrative and legal complexities and avoid redundancies associated with *Shariah* compliant financial products which would further enhance risk management process and reduce administrative costs.

Furthermore, the global Islamic banking average non-performing financing (NPF) ratio was 4.96% as of 3Q19. For example, in comparison to conventional banks, the Islamic banking sector's NPF is higher in both European Union and USA, with an average NPF of 2.5% and 1.5%, during the same period (IFSB, 2020). Higher NPF ratio of the Islamic banks could be attributable to vulnerable exchange rate regimes, and/or to economic and geopolitical risks in some emerging markets that are home to a large proportion of Islamic banking activities worldwide. For example, the NPF rates for Islamic banks in Saudi Arabia increased for 2019 (0.84% in 2Q17, 0.95% in 2Q18, and 1.24% in 2Q19). In contrast the NPF rates in UAE was 4.8% in 3Q19. It was forecasted that the Emirati banks may suffer rising impairment in their assets in 2020 due to subdued economic activity and the drop in real estate prices (IFSB, 2020). For example, the average loss rate in case of default for 2019 for Maybank Group, Malaysia (based on their 2019 Basel II disclosure) is presented in Table 7 below:

Table 7: Average loss rate in case of default

Public sector utilities	Corporate (excluding specialised and firm-size adjustemnt lending)	Retail residential mortgages	Retail other
41.06%	42.49%	14.82%	32.43%

Source: Maybank Group (2019)

Further, Al Baraka banking Group, Bahrain in their financial reports for 2018 stems credit risk in non-performing financing from receivables as the most important presented in Table 8 below:

Table 8: Financing from receivables, *mudarabah* and *musharakah*

Type of Islamic financing contract	Neither past due nor non performing	Past due but performing	Non performing (NPF)
Receivables*	8,976,524	1,142,110	751,737
Mudarabah and Musharakah	2,705,121	20,719	12,974

*Notes: *Receivables includes: murabahah receivables, salam receivables and istisna' receivables; all data in USD '000*

Source: Al Baraka Banking Group (2018)

In addition, total NPF receivables as a percentage of neither past due nor non performing (751,737/8,976,524) is 8.38% and total NPF *mudarabah* and *musharakah* contracts to neither past due nor non performing (12,974/2,705,121) is 0.47%; highlighting the possibility receivables contracts to inherit far more credit risk than *musharakah* and *mudarabah* contracts. That is contrary to the finding of Rahman et al. (2010) that *mudarabah* is the riskiest mode of financing. In the light of the pandemic crisis, these findings call for an urgent re-assessment of the credit risk management in Islamic banks. The implementation of AI based solutions could help in reducing the NPF percentages by detecting automatically suspicious loan applications and predicting customers' next scheduled payment.

Further, World Bank historical estimates were for 1.7 billion unbanked retail customers and more than 200 million potential micro, small, and medium enterprises (MSMEs). Subsequently, nearly 75% of the world's unbanked population live in developing economies, with the highest found in Asia (World Bank, 2020). Almost 50% of the world's unbanked population live in Muslim populated countries. The potential revenue from the unbanked retail and MSMEs market was estimated to be around USD 200 billion (World Bank, 2020). The implementation of AI based solutions could help to allow these customers to open bank accounts with ease and to apply for a loan within minutes. Noticeable example is Benazir Income Support Programme by the

Government of Pakistan who used mobile money transfer to reach more than 6.8 million families in less than a week (Benazir Income Support Programme (2022).

5. Conclusion and Recommendation

Governments and central banks all over the world have announced financial assistance and relief packages for the most affected sectors to reduce the impact of health crisis and lockdowns. The monetary policies are loosening; massive plans for cash transfers are distributed; and government-sponsored credit programs are in place in various countries for pandemic-affected small and medium enterprises with the aim to lessen the impact of the pandemic and to get back the economy on-track. At the same time, banks have suffered more, especially the ones with the highest level of credit risk (Aldasoro et al., 2020). In addition, Islamic banks face higher risk than traditional banks, and understanding and management of credit risk identification and assessment is much different (Noman et al., 2015). In the light of the pandemic crisis, these findings call for an urgent re-assessment of the credit risk management of Islamic banks.

On the other hand, Islamic fintech has much to offer – and there is an important role of collaboration between startups and the established Islamic finance institutions. By incorporating FinTech-based solutions, Islamic banks could create financial products that are both *Shariah*-compliant and cheaper, reach the unbanked population and unserved companies with ease, improve their risk management process and overcome some of the negative impacts of COVID-19 crisis, which in turn will increase their efficiency and profitability.

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The Role of Islamic Fintech P2PL in Increasing Inclusion and Financial Literacy of MSMEs

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Abstract

This study aims to analyze the role of Islamic financial technology (fintech) peer-to-peer lending (P2PL) in increasing the inclusion and financial literacy of Micro, Small, and Medium Enterprises (MSMEs). The presence of fintech in Indonesia provides various benefits, especially when the unbankable is still widely spread in various regions. No exception for MSME players, P2PL fintech services provides an easier option for them to get access to funding. The research sample is on three P2PL-based fintech that uses *Shariah* principles in Indonesia. Data were obtained through interviews and relevant literature sources. The analytical method used is descriptive qualitative. The results of the study show that there are at least four roles that *Shariah* P2PL fintech can do to increase MSMEs financial inclusion, such as: providing digital-based financial services, facilitating financing application requirements, collaborating with various businesses groups, and collaborating with digital ecosystems. Meanwhile, to improve literacy, P2PL fintech socializes to regions, holds seminars and webinars, uses digital media to optimize fintech, and plays an active role in financial inclusion activities organized by various parties.

Keywords: peer-to-peer lending; financial inclusion; financial literacy; micro small and medium enterprises

1. Introduction

Technological advances have touched every area of life, including the financial sector. Financial technology (fintech) is one form of technological progress from various financial innovations in the era of the industrial revolution 4.0 (Iip, 2018). According to Bank Indonesia (2020) "financial technology or fintech is the use of technology in the financial system that produces new products, services, technology, and/or business models and can have an impact on monetary stability, financial system stability, and/or efficiency, smoothness, security and reliability of the payment system."

The presence of fintech in Indonesia provides various benefits, especially when the underserved and the unbanked are still widely spread in various regions. No exception for Micro, Small, and Medium Enterprises (MSMEs), fintech services such as peer-to-peer lending (P2PL) provide easier options for them to gain access to funding for capital assistance (Bella, 2020; Nurohman et al., 2021). Especially when talking about micro-scale businesses, there are still many who have not been touched by access to conventional financial institutions. There are many gaps that P2PL fintech is trying to bridge, ranging from more affordable access through technology to the creditworthiness assessment process that can be more adapted to the conditions of MSME actors (Bollaert et al., 2021; Dailysocial.id, 2021; Saiedi et al., 2020).

In addition, to ensure that MSMEs can take advantage of P2PL loans, the role of the government and improving financial literacy are important (Sahela et al., 2021). Financial literacy can help MSME actors to be

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careful in borrowing capital through P2PL loans by providing a better understanding of the internal financial conditions of their business and how capital can be used to develop a business (Hussain et al., 2018; Okello et al., 2017; Ye and Kulathunga, 2019). Financial literacy can also prevent them from being trapped in debt by illegal P2PL loan providers (Aprita, 2021; Yahya et al., 2020). Along with the proliferation of conventional fintech companies, *Shariah* fintech companies are also starting to grow. Although *Shariah* fintech is still in the development stage, it brings extraordinary opportunities, for example, it can increase financial inclusion, especially *Shariah* financial inclusion which is still low (National Islamic Finance Commite, 2019).

Based on data from the Financial Services Authority (FSA) until 2020 the Islamic financial inclusion index in Indonesia is still very low, at 9.1% or far behind the national inclusion index which has touched 76.10%. While the Islamic financial literacy index in Indonesia is 8.93%, it is also still low compared to the national literacy index of 38.03% (Silaban and Rosana, 2021).

2. Literature Review

A. Financial Technology (*Fintech*)

In general, financial technology (fintech) is a technology-based system that provides financial solutions for its users (Arner et al., 2015). Fintech is also defined as the application of digital technology that aims to overcome various financial intermediation problems (Aaron et al., 2017). Meanwhile, according to the Financial Stability Board (FSB) fintech is a new form of financial services, both in terms of business, applications, processes, and products as part of increasingly advanced technological innovations (Dudley and Knot, 2017).

Like other bank and non-bank financial institutions, fintech is also classified into two types, conventional fintech, and Islamic fintech. Islamic fintech offers financial services like fintech in general by prioritizing *Shariah* principles in each product and its operations. In Indonesia Islamic fintech has received approval from the MUI National Sharia Council Fatwa No. 117/DSN-MUI/II/2018.

B. Peer to Peer Lending (P2PL)

Peer-to-peer lending is a financial service that connects parties who need loans directly with those who provide loans. Peer-to-peer lending is one of the most well-known forms of fintech because with advances in digital technology the form of P2PL services has become very easy to implement. Apart from directly connecting lenders who are capital owners with loan recipients (who need capital), P2PL also reaches out to many unbankable groups such as MSMEs. The definition of P2PL itself according to FSA (2017a), "fintech lending or P2PL or online lending is the provision of financial services to bring together lenders or lenders with loan recipients or borrowers to enter into lending and borrowing agreements in rupiah currency directly through an electronic system." Fintech lending is also known as technology-based lending and borrowing services.

C. Financing

Financing according to the Law of the Republic of Indonesia No. 21 of 2008 concerning Islamic Banking, explains that "financing is the provision of funds or equivalent claims in the form of 1) Profit-sharing transactions in the form of *mudarabah* and *musyarakah*. 2) Lease transaction in the form of *ijarah* or lease purchase in the form of *ijarah muntahiya bittamlik*. 3) Sale and purchase transactions in the form of *murabahah*, *salam*, and *istisna'* receivables. 4) Lending and borrowing transactions in the form of *qardh* receivables. 5) Service-leasing transactions in the form of *ijarah* for multi-service transactions based on an agreement or agreement between the *Shariah* Bank and/or *Shariah* Business Unit and other parties that require the party being financed and/or given a fund facility to return the funds after a certain period in exchange for *ujrah*, without reward, or profit-sharing." The contracts used in *Shariah* financing as regulated in the Fatwa of the National Shariah Council of MUI No. 117/DSN-MUI/II/2018 concerning information technology-based financing services based on *Shariah* principles, including sale and purchase contracts, *ijarah*, *musyarakah*, *mudarabah*, *qardh*, *wakalah*, *wakalah bi al-ujrah*, and standard contracts.

D. Micro, Small, and Medium Enterprises (MSMEs)

According to the Law of the Republic of Indonesia No. 20 of 2008, the definition of Micro, Small, and Medium Enterprises (MSMEs) are:

> "1) Micro Enterprises are productive businesses owned by individuals and/or individual business entities that meet the criteria for Micro Enterprises. 2) Small Business is a productive economic business that stands alone, which is carried out by individuals or business entities that are not subsidiaries or not branches of companies that are owned, controlled, or become part either directly or indirectly of Medium Enterprises or Large Businesses that meet Small Business criteria. 3) Medium

Enterprises are productive economic businesses that are stand-alone, which are carried out by individuals or business entities that are not subsidiaries or branches of companies that are owned, controlled, or become part either directly or indirectly with small businesses or large businesses with total assets, net or annual sales results."

E. Financial Inclusion

The availability of public access to financial services is regulated in the Financial Services Authority regulation No. 76/POJK.07/2016. The regulation explains that the availability of financial access aims to improve the welfare of the community. The availability of access to finance, which is commonly known as financial inclusion, includes various accesses to financial institutions, products, and financial services that are by the needs and abilities of the community. Financial inclusion is not only about the availability of access, but also includes the process of getting easy access, availability, and use of the formal financial system (Sarma, 2012). World Bank (2018) defines "financial inclusion as access to useful and affordable financial products and services in meeting the needs of the community and their businesses in this case transactions, payments, savings, credit, and insurance that are used responsibly and sustainably."

F. Financial Literacy

According to the Financial Services Authority (FSA) Regulation No. 76 /POJK.07/2016, "financial literacy is knowledge, skills, and beliefs, which influence attitudes and behavior to improve the quality of decision making and financial management to achieve prosperity." Financial literacy is expected by FSA to provide benefits to the wider community such as the ability to choose and utilize financial products and services that suit their needs, can do better financial planning, and avoid investing activities in unclear financial instruments (FSA, 2017b).

Someone in the financial decision-making process must at least have the knowledge, skills, and confidence so that the decisions they take can be accounted for (Palameta et al., 2016). The knowledge referred to here is a person's understanding of himself and the financial problems he faces. Meanwhile, skills are a person's ability to implement their financial knowledge to manage their finances. Finally, what is meant by self-confidence here is confidence in making financial decisions. In addition, the FSA "divides the level of financial literacy of the Indonesian people into four, namely Well literate, Sufficient literate, Less literate, and Not literate" (FSA, 2017b).

3. Research Methods

A. Data Types and Sources

The types of data used in this research are primary and secondary data. The primary data in this study were obtained from the results of direct interviews by researchers with *Shariah* fintech PT. Alami Fintek Shariah, PT. Investree Radhika Jaya, and PT. Qazwa Mitra Hasanah. The informant who was interviewed directly is one of the leaders or representatives of each related fintech. The selection of the three *Shariah* fintech was based on the willingness of the three to be research sources. This refers to the convenience sampling technique, which is a sampling technique based on the availability of elements and the ease of obtaining them (Sugiyono, 2017). While the secondary data in this study is in the form of information about the three *Shariah* fintech that are the research samples, be it company profiles, funded project activities to other activities that can be used as supporting data in this research. The secondary data is obtained through intermediary media that can be accessed widely, such as from websites, application platforms, social media, and various other report archives.

B. Data Processing and Analysis Method

This study uses a qualitative approach in which data analysis is carried out simultaneously with the data collection process. So, during the data collection process, the data analysis process has also begun. After each interview, the data analysis process is carried out by identifying all data obtained from sources and secondary sources such as fintech website publication media. In each interview session, it is always strived to have new data that is different from the previous interviewees. The previous interview process is used as a reference for the subsequent interview process to confirm the previously obtained data and explore new data. This process continues to be repeated until there is no new data either obtained from interviews or secondary sources. In general, the data analysis method in this study refers to the Analysis Interactive Model from Miles and Huberman (Sugiyono, 2017). The stages of data analysis are divided into several stages, such as data collection, data reduction, data display, and conclusion drawing/verification.

4. Results and Discussion

Based on data from the Financial Services Authority (FSA) as of November 17, 2021, the total number of registered and licensed P2PL fintech operators at the FSA is 104 providers, 8 of which are Islamic fintech P2PL (FSA, 2021). This study focuses on Islamic fintech P2PL registered and licensed with the FSA. Three Islamic fintech are the object of research and resource persons in discussing the problems in this research, namely PT. Alami Fintek Sharia, PT. Investree Radhika Jaya, and PT. Qazwa Mitra Hasanah.

Table 1. List of *Shariah* P2PL Fintech in Indonesia

No	Company name	Year of Establishment	CEO
1	PT. Alami Fintek Sharia	May 27, 2020	Dima Djani
2	PT. Investree Radhika Jaya	May 13, 2019	Adrian Gunadi
3	PT. Qazwa Mitra Hasanah	August 24, 2021	Dikry Paren
4	PT. Ammana Fintek Syariah	December 13, 2019	Lutfi Adhiansyah
5	PT. Dana Syariah Indonesia	February 23, 2021	Taufiq Aljufri
6	PT. Duha Madani Syariah	April 21, 2021	Hot Asi
7	PT. Piranti Alphabet Perkasa	September 8, 2021	Nugroho
8	PT. Ethis Fintek Indonesia	September 17, 2021	Ronald Yusuf Wijaya

Source: FSA (2021)

Based on the results of research in the form of interviews and secondary data collected from the three Islamic P2PL fintech, it can be summarized how the three of them increase the inclusion and financial literacy of MSMEs in Indonesia. How the three Islamic P2PL fintech improve financial inclusion include the following:

1. Providing digital-based financial services in the form of websites and mobile apps that are easily accessible by all members of the public.

   This is the main advantage that fintech has compared to banks and other financial institutions. This is what makes fintech have easy access to reach the market, thus the ability to encourage the level of financial inclusion will be faster and its reach will be wider. Such as a research conducted by Marlina and Fatwa (2021) where Islamic fintech acts as a driving factor in increasing the inclusiveness of Micro, Small, and Medium Enterprises (MSMEs) in Indonesia. The presence of the Islamic fintech industry can overcome the problems of MSMEs in Indonesia, especially related to financing needs, ease of transaction processing, expansion of market access, and ease of preparing financial reports.

   The characteristics of this fintech match very well with Indonesia as an archipelagic country with various types of geography on each island. Digital-based financial services such as those carried out by P2PL fintech have proven to be able to increase the number of MSMEs that are affordable by financial institutions in each region which automatically increases financial inclusion. This is supported by the research of Prestama et al. (2019) which explains that Islamic P2PL fintech is able to serve people who have not been reached by Islamic financial institutions, which of course increases Islamic financial inclusion and ultimately helps the development of the Islamic finance industry. Most of the people who have not been reached by Islamic financial institutions are MSMEs. This shows that Islamic fintech participates in increasing the inclusion of MSMEs in Indonesia, where most MSMEs find it difficult to reach financing from banks (unbankable).

   The three Islamic P2PL fintech continue to strive to improve supporting applications to make them more accessible to the public. This is of course also carried out by all fintech considering the need for updates in technology-based applications. However, the availability of the internet network is the main obstacle in optimizing this advantage. The unequal distribution of internet networks in all regions in Indonesia makes business actors, especially MSMEs, unable to access the existence of fintech so efforts to encourage financial inclusion are still limited. This supports research from Muzdalifa et al. (2018) which says that one of the obstacles faced by fintech in increasing financial inclusion is infrastructure.

2. Provide ease of requirements in applying for *Shariah*-based financing.

   It is very convenience to apply for *Shariah* financing through Islamic P2PL fintech. By registering online through the fintech website, then the fintech will ask the borrower to provide some personal details, including invoices and valid company legal documents. Then the financing application will be analyzed and selected through the credit-scoring system. After the application is approved, the financing will be displayed on the fintech website. Compared to banking financial institutions, the financing application process at Islamic P2PL fintech is more flexible and fully controlled for funding costs, without paperwork and involving faster decisions. In addition, Islamic P2PL fintech also determines *ujrah* for *wakalah* services that compete with each financing. Therefore, by utilizing technology and the ease of loan terms, people are increasingly interested in using Islamic P2PL fintech services.

   Many people choose to borrow or fund *Shariah* P2PL fintech. This is because the terms and conditions requested are easier than conventional financial institutions such as banks and cooperatives. This is in line with a research conducted by Putri and Friantin (2021) which says that Islamic fintech has a significant impact on increasing MSMEs financial inclusion. The various services offered by *Shariah* fintech to increase MSMEs show that the modern financial system can have a good impact on empowering MSMEs. Apart from the various risks to be encountered, *Shariah* fintech offers an easy and modern financial system that is in accordance with religious guidance.

3. Cooperating with various business groups, such as e-commerce and e-procurement in *Shariah* financing to MSMEs.

   For Islamic fintech P2PL, e-commerce is useful for providing data or transaction history records of prospective buyers or businessmen on electronic trading platforms who will become borrowers of funds. This is to see the activity and development of the transaction, making it easier to identify potential borrowers. Meanwhile, for e-commerce, *Shariah* P2PL fintech players will provide alternative payment methods. That way, payments to e-commerce are not only through credit cards, bank transfers, mobile payments, or internet banking. This payment alternative can expand the reach of the market or buyers in e-commerce which in turn can increase the volume of transactions.

   Therefore, the prospect of P2PL Islamic fintech cooperation with e-commerce in the future is very wide open. This collaboration can be in the form of funding for the sale of e-commerce goods or services as well as funding for merchants or online stores in the ecosystem. This is in line with a research conducted by Tripalupi and Anggahegari (2020) saying that Islamic fintech has the potential to develop, in terms of cost-effectiveness and process efficiency and there is an increase in the use of digital financial services (fintech) through online shopping platforms, payments, and loan.

4. Cooperating with digital ecosystems, both established and newly developing.

   The role of P2PL fintech in a digital ecosystem is increasingly felt, as the number of MSME actors who are literate in the use of technology has begun. The rise of MSMEs business solution startups in Indonesia coincided with the growth of the P2PL fintech platform in the productive financing sector. Both also aim to overcome the obstacles that are often encountered by MSMEs. For example, not efficient in business planning, still applying manual financial records, low ability to take advantage of technological advances, and low knowledge in obtaining digitally productive funding. This is in line with a research conducted by Saripudin et al. (2021) and Tripalupi and Anggahegari (2020) which says that Islamic fintech has the potential to develop in terms of accelerating the digitization of financial services and technology that supports the acceleration of the digitization of financial services.

   Therefore, a partnership is a necessity. Fintech actors seek to expand their business by attracting MSME players in a digital ecosystem, while technology companies as ecosystem managers also need fintech capabilities to accommodate user needs. For example, the ecosystem of Investree partners that has now been entered and has become a mainstay in increasing market share, including Gramindo, SIPLah Blibli, eFishery, Mbiz Market, and Pengadaan.com. Meanwhile, ALAMI collaborates with ecosystem partners, namely eFishery. It is different for Qazwa, who collaborates with the point of sales partners, including Qasir and Qopnet, in helping MSMEs to get access to cheap working capital loans. For fintech, entering the ecosystem is not only business expansion, but also plays a role in providing financing to MSMEs with an easy and fast process. If there is already a fintech (ecosystem), everything can be done on one platform.

How the three Islamic P2PL fintech improves financial literacy include the following:

1. Conduct outreach to the community and MSMEs to the regions.

   Islamic P2PL Fintech is actively conducting outreach and education activities to the entire community, especially MSMEs. The socialization was carried out by introducing financial products and services through Islamic P2PL fintech to the public and MSMEs. This activity is carried out so that the public is interested in knowing more about Islamic P2PL fintech. In addition, it is hoped that it can help MSMEs actors to understand the proper use of Islamic P2PL fintech, to maximize business productivity, to encourage the progress of the regional economy with the potential possessed by these MSMEs actors.
2. Organazing seminars and webinars for MSMEs actors.

   During the Covid-19 pandemic, there was a change in people's consumption patterns due to the stay-at-home policy, from conventional shopping patterns to online shopping patterns, this became a challenge as well as an opportunity for MSMEs actors in marketing their products. The webinar activity aims to provide education about the benefits of business digitization to MSMEs during the Covid-19 pandemic, encouraging them to continue to be able to compete and innovate through technology by prioritizing safety, health, and good products quality to increase public confidence in buying products produced by other SMEs. This is in line with Marginingsih (2021) which explains that during the Covid-19 pandemic fintech played an important role in increasing financial inclusion which had an impact on people's welfare.
3. Use of digital media to optimize fintech for MSMEs.

   Over time, MSMEs actors inevitably have to keep up with increasingly sophisticated technological developments. Increasing the use of digital is one of the steps to accelerate the economy that can bring good opportunities for MSMEs actors in Indonesia. This is a must for MSMEs actors in the digital era because of course they need tools to attract consumers widely. In addition, the thing that is not less important is marketing. Today, of course, it is not just about traditional marketing or just words of mouth. It takes a very extraordinary marketing transformation and requires improving the skills of MSMEs actors. Digital media is an economic tool that can be used to develop user ideas, innovation, and creativity in entrepreneurial activities. This is very important for an MSMEs to be able to market its products digitally. Especially in this digital era, MSMEs actors can use social media to market their products/services online. This will provide great opportunities for the development of MSMEs. This is in line with a research conducted by Tripalupi and Anggahegari (2020) which states that there are fintech opportunities where Islamic fintech has the potential to develop, one of which is the acceleration of the digitization of financial services, technology that supports the acceleration of the digitization of financial services, and the increase in MSMEs financing.
4. Financial Inclusion Month activities by the Financial Services Authority (FSA).

   Events organized by the FSA take place throughout the month of October. At this event, FSA invites all financial institutions and other institutions to participate in this success, including Islamic P2PL fintech. Financial Inclusion Month aims to increase public understanding and use of financial products or services so that they can support the implementation of the National Economic Recovery program to minimize the impact of the Covid-19 pandemic. To enliven Financial Inclusion Month, especially for Islamic finance, and contribute to increasing financial inclusion and literacy in Indonesia, throughout October there were many events and promotions carried out by Islamic P2PL fintech.

5. Conclusion and Recommendation

Based on the results of the analysis conducted, several conclusions can be drawn from this study, including:

1. The methods used by the three Islamic P2PL fintech in increasing financial inclusion include a) Providing digital-based financial services, both in the form of websites and mobile apps that are easily accessible by all members of the public. b) Providing ease of requirements in applying for *Shariah*-based financing. c) Cooperating with various business groups, such as e-commerce and e-procurement in *Shariah* financing to MSMEs, and d) Cooperating with digital ecosystems, both established and newly developing.
2. The methods used by the three *Shariah* P2PL fintech in improving financial literacy include: a) Conducting socialization to the community and MSMEs to the regions. b) Holding seminars and webinars for MSMEs actors. c) Use of digital media to optimize fintech for MSMEs, and d) Financial Inclusion Month activities during October.

In this research, there are still many aspects that need improvement. Therefore, there are suggestions or recommendations for the parties concerned, as follows:

1. For future researchers, to increase the number of sources with a wider scope of research so that interview results can be more accurate and get more data from Islamic fintech registered with FSA.
2. For Islamic P2PL fintech players, to increase socialization and education activities by holding special seminars on empowering micro-enterprises who still do not understand financial services, so that their awareness and financial literacy increase and can become more developed and competitive business actors. In addition, fintech companies should be able to expand the reach of access to financing not only in Jakarta, Bogor, Depok, Tangerang, Bekasi (Jabodetabek) but also to various areas where access to banking financial services has not been reached (unbankable). Also, do not forget to always deepen your knowledge of *fiqh muamalah* considering the dynamics of the contemporary financial world, and refer to the guidelines issued by competent jurists in their fields such as the DSN-MUI and AAOIFI (Accounting and Auditing Organization for Islamic Financial Institutions) to ensure strict *Shariah* compliance.
3. For the general public, Islamic P2PL fintech is an alternative to *Shariah* financing that is convenience and fast and can improve inclusion and higher public financial literacy.

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Measuring Financial Knowledge Among Muslim Women: The Case of Indonesia and Malaysia

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Abstract

Financial literacy is taking an important role in supporting the development of women's empowerment. To determine the action for financial education for women, the level of financial literacy among women is needed to be observed. This study aims to measure the level of financial knowledge among Muslim women in Indonesia and Malaysia. A quantitative method of study is employed by distributing 411 questionnaires that consists of Islamic financial knowledge and general financial knowledge questions. As the sample of this study focuses on women in Indonesia and Malaysia, the findings of this study could not be generalized to other Muslim women in other countries. The research found that Muslim women in Indonesia and Malaysia have a moderate Islamic and general financial knowledge level. Several areas of weaknesses found in this study are; the understanding of the role of parties in *mudharabah* contract, knowledge on *zakat*, and the simple time value of money calculation. These three areas of weaknesses could be emphasized in the financial education program.

Keywords: financial literacy, women financial literacy, Islamic financial literacy, financial knowledge, financial attitude

1. Introduction

Women empowerment is a cornerstone of the 2030 Agenda for Sustainable Development. Women in OECD high-income economies were around 20% less likely than men to report borrowing from a financial institution in 2014, according to Demirgüç-Kunt et al. (2015). The majority of women cannot comprehend how various financial products and financial services operate, especially in the areas of mortgages and investing (Melissa, 2011). Entry to financial services is more difficult for women than it is for men. Women in many countries have less financial literacy than men, owing to limited access to education, employment, entrepreneurship, formal financial markets, and discriminatory social norms and legal treatment.

Understanding the level of financial literacy among women is needed to determine further action for financial education. Financial literacy is taking an important role in supporting the development of women's empowerment. However, there are still few studies observing Islamic financial literacy compared to general financial literacy. Islamic financial literacy is essential for Muslim women making their financial decision because it is part of understanding the principles of Islam. It is not sufficient to know about Islamic from the product information of the bank or the news; a specific education programme on Islamic financial literacy should be considered.

According to the OECD report by Messy and Monticone (2013), women tend to have lower levels of financial knowledge, particularly less well-educated women. Women also show different financial attitudes whereby they appear to be aware of their lack of financial knowledge and low confidence in financial matters. However, it is reported that women are more likely to have a budget and keep a close watch on everyday financial expenses. Given the fact that women are less likely to engage in working activities (Atikson and Messy, 2012), women tend to cut down their spending instead of earning extra money (Messy and Monticone, 2013).

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This study takes the sample population from Indonesia and Malaysia. The two countries are selected in this study because the development of the Islamic economy in both countries is growing rapidly. According to the Global Islamic Finance Report (2019), Indonesia and Malaysia are the highest ranks in the Islamic Finance Country Index (IFCI, 2019). Indonesia ranked first, followed by Malaysia in the second position. Regarding the women's financial literacy in both countries, the report shows evidence that women lag behind men in terms of financial wellbeing. Although women were reported to have higher savings behaviour than men, women typically accumulate significantly less savings than men. OJK (Indonesian Financial Service Authority) reported that there is a gender gap in financial literacy and financial inclusion indexes between men and women. Women are reported to have 3.81% and 2.09% lower in financial literacy and financial inclusion indexes. Meanwhile, in Malaysia, Haotanto (2018) reported that men are still better at monthly savings than women. Men were also found to have financial planning with 32%, compared to 28% of women. A study by Sawandi et al. (2018) also found that Malaysian female respondents were found to have a lower level of financial knowledge than male respondents.

In the current economic circumstances, consumers are required to make many complex financial decisions. In the last decade, the efforts to improve the community's financial literacy have been widely carried out and became an important agenda by various countries, which transformed into various government programs and research in measuring financial literacy. However, it is still relatively rare to find a study discussing measuring financial literacy among Muslims (Setiawati et al., 2018). It is necessary to observe Muslim's financial literacy because some of the criteria used to determine financial literacy are distinct from Islamic values. The Muslim community encourages Muslims to practice Islamic financial literacy not only because it is an obligation to obey Islamic values per se but also because of the availability of complex financial instruments that raise awareness of Islamic financial products. It assists Muslims in making financial decisions based on Islamic financial understanding.

2. Literature Review

2.1 Financial Literacy

The President's Advisory Council on Financial Literacy (PACFL, 2008) defined financial literacy as the ability to use knowledge and skills to manage financial resources effectively for a lifetime of financial wellbeing. A financially literate individual can boost their financial situation. In addressing the financial issue, women have to be financially literate in order to handle their cash flow and financial resources wisely to ensure their long-term financial condition and support their families.

The OECD (2018) defines financial literacy for adults as "a combination of awareness, knowledge, skill, attitude, and behaviour necessary to make a sound financial decision and achieve financial wellbeing". In the context of small-medium enterprises, financial literacy is defined as "the combination of awareness, knowledge, skill, attitude, and behaviour that an entrepreneur or an owner of the micro, small, medium businesses should have to for an effective financial decision making to start, run, and ensure the sustainability and growth of the business" (OECD, 2018).

In today's world, financial literacy is just as important as basic literacy, which includes the ability to read and write. Individuals and societies cannot reach their full potential without it. Lusardi (2019) described financial literacy as a global passport that allows individuals to take advantage of the market's wide range of financial products and make sound financial decisions. Financial literacy should be viewed as a fundamental right and universal need rather than a privilege enjoyed by a small number of people who have special access to financial knowledge.

Financial literacy, in most situations, is a model for financial education that describes variations in financial outcomes. The terms "financial literacy" and "financial education" are often interchanged in the literature and mass media. Understanding the educational influence and obstacles to financial decision-making requires defining and assessing financial literacy. The Institute for Financial Literacy measured financial literacy using five criteria as follows:

1. Money management is the use of cash-flow management and net worth analysis to accomplish financial objectives.
2. Credit: knowing how to get credit and the consequences of using/misusing it.
3. Debt Management: knowing how to use debt to accumulate assets and understand how to assess and resolve the debt issue.
4. Risk Management: Using risk management strategies to secure the assets and improve the quality of life.
5. Investing and Retirement Planning: Using savings and retirement plans to achieve financial goals.

On the other hand, Huston (2010) defined four standards to measure financial literacy:

1. Money basics: understanding the fundamentals of finance, such as personal financial accounting principles, purchasing power, and the time value of money.
2. Investing: consider how to bring existing capital to good use in the future.
3. Borrowing: consider how to carry money from the future into the current.
4. Asset protection: understanding the approaches for securing properties.

Huston (2010) described financial literacy as comprehending personal finance knowledge and implementing it in financial applications. The first dimension is knowledge; it is an understanding of the financial product gained through education and practice. The other is the implementation dimension, which is the ability to apply knowledge to personal finance decisions efficiently.

Financial literacy is a form of human capital that has the potential to influence consumption utility. Other factors such as behavioural/cognitive bias, self-control, family, social, economic, and institutional factors have an impact on a person's financial behaviour and wellbeing. At the same time, financial education is characterized as an input to improve human capital through understanding and application of financial knowledge (Huston, 2010). Financial literacy improves people's understanding of financial products, services, and principles to make the best financial decisions possible. A well-structured financial literacy plan will help people make better financial decisions and develop their financial skills.

Thomas and Subhashree (2020), in their study on financial literacy among the students, found that financial literacy is influenced by financial knowledge, financial attitude, family influence, and peer-group pressure. The outcome of being financially literate, someone can have positive economic returns related to better planning, investment, borrowing, financial wellbeing, financial capability, and financial inclusion (Goyal and Kumar, 2020). Additionally, a study on financial literacy and female entrepreneurs by Tumba et al. (2022) found that financial education helps the performance of micro-businesses owned by female entrepreneurs.

In a recent study, financial literacy was found to have a positive relationship with financial behaviour (Widyastuti et al., 2020). Furthermore, a study by Shankar et al. (2022) found that financial behaviour is positively related to financial wellbeing. They added that gender, parental education, employment status, and monthly income change influence financial wellbeing.

2.2 Islamic Financial Literacy

There have been some studies related to Islamic financial literacy but the studies barely defined the definition of Islamic financial literacy explicitly. Islamic financial literacy was mainly defined as general financial literacy, which is tailored to the system and obligations that must meet the principles of Islamic finance. Salehudin (2010) came up with the term "*halal* literacy," which he described as the ability to differentiate between *halal* and *haram* ruling. *Halal* is a *Quran*ic term that means permitted, allowed, legal, or lawful in the Holy *Quran*. *Haram*, on the other hand, means forbidden, illegal, or unlawful. In Islam, there are things that are *halal* and things that are forbidden and designated as *haram*. As Muslims, we should strive to follow what is permissible and strictly avoid what is forbidden (The Concept of *Halal* & *Haram* in Islam according to *Quran Hadith*, 2020).

In contrast, Razak and Abdullah (2015) described Islamic financial literacy as a broader concept that encompasses financial or basic wealth management (income, consumption, and savings), as well as financial planning (*takaful*, pension schemes, and *Shariah*-compliant investment). The research also stressed the responsibilities that he believes should be enforced in Islamic finance, such as *zakat*, inheritance law (*faraid*), and charitable donations (*wasiyyah*) (*waqf* and alms). A study by Antara et al. (2016) also defined "*halal* literacy as a person's ability by combining a set of knowledge, awareness, and skills to distinguish between *halal* and *haram* on products and services based on *Shariah* law."

Rahim et al. (2016) proposed the conceptual definition of Islamic financial literacy as "the ability of a person to use financial knowledge, skill and attitude (OECD, 2016) in managing financial resources according to the Islamic teachings". They studied Islamic financial literacy determinants among university students and found that religiosity is the most influential determinant, followed by hopelessness and financial satisfaction. Setyowati et al. (2018) tested the effect of the level of financial literacy and personal financial planning. People with a good level of Islamic financial literacy tend to have better management and personal finances and prefer investing in *Shariah*-compliant assets.

2.3 Financial knowledge

Financial literacy has been defined as not merely being knowledgeable on financial matters but also the ability to make such financial decisions based on financial knowledge. Huston (2010) elaborated that there are two dimensions of financial literacy: knowledge and application. Huston argued that financial knowledge is not the same as financial literacy; rather than it is a component of it. The ability and confidence to use financial information to make a financial decision is also an additional application dimension of financial literacy.

Huston (2010) defined financial knowledge as understanding key financial terms and concepts for financial decisions. A financially literate individual would have a clear understanding of financial principles and the ability to apply numeracy skills to a financial situation (Atkinson and Messy, 2012). Financial literacy requires individuals to be able to compare financial products and services in order to make the best financial decisions. Basic financial principles and the ability to apply numeracy skills in a financial context assist an individual in managing their finances and responding to financial conditions and economic events that can affect their financial wellbeing (OECD, 2016). Yahaya et al. (2019) found that financial knowledge significantly influences financial attitude. It is further supported by a study by Hussain et al. (2018), which found that financial knowledge enables SMEs to access external finance, which assists the firm to operate at an optimum level and growth. According to a study by Yong et al. (2018), young working adults should know about budgeting, controlling their expenditures, practicing living within their means, constantly tracking expenses, saving and retirement planning, and unforeseen expenses to perform better financial wellbeing.

2.4 Islamic principles of financial knowledge

Islamic finance is the knowledge and implementation of *Shariah* (Islamic law) injunctions and rules that prevent unfairness in the acquisition and disposal of material or asset resources in order to satisfy people and enable them to obey Allah and society. As Allah said in the *Qur'an*:

"But seek, through that which Allah has given you, the home of the Hereafter; and [yet], do not forget your share of the world. And do good as Allah has done good to you. And desire not corruption in the land. Indeed, Allah does not like corrupters." (Al-*Quran*, 28:77).

Islamic financial knowledge is not merely understanding the basic knowledge of finance and numeracy skills for a financial decision but also understanding the spirit and principles of Islamic economics so Muslims would understand their right and obligation to manage resources and wealth and make better decision-making. According to Ma'rifa Academy (2014), several principles in the Islamic economy are derived from *Quran* and *Sunnah* that every Muslim should understand before involving in economic activity.

1. Ownership: All wealth and resources on the earth and in the heavens were created by Allah. Allah is the true owner of this universe, including all resources, wealth, and production factors. Therefore, every human being has an equal right to use the resources created by Allah.
2. Men and his position on earth: Human beings have been created in the best stature. They have the ability to select between good and evil. They also have rights and obligations. Therefore, they have to fulfill both the rights of Allah and His creation and will be rewarded based on what they did.
3. Wealth and resources: Allah created abundant wealth and resources to support human existence on this earth. Every human is encouraged to work hard to earn and utilise those resources to collect the wealth prescribed by Allah and avoid engaging in prohibited activities.
4. Economic activities: This includes production, distribution, and consumption. In the distribution process, whatever is being produced should be divided among those involved in the production, according to their share, without any deception. There should not be exploitation of the weak and the poor in the activity of production.
5. Trade and Business: The Prophet Muhammad (Peace be upon Him) too preferred trade and always encouraged businesses. Trade is allowed by mutual consent without harming one another. "...they say: trade is (just) like interest. But Allah has permitted trade and has forbidden interest..." (Al *Quran* 2:275).
6. Debt: Excessive debt is discouraged in Islam except under conditions where it becomes a necessity (Sipon et al., 2014). People who are engaging in debt-based transactions should ensure they have the ability and capability to repay the debt in accordance with the terms and conditions of the debt arrangement. If someone is contracted to debt and not repaying it, or without intention to repay, it means that he has committed a sin.

7. *Zakat* and Charity: *Zakat* is a determined amount of wealth that is paid annually from a person's wealth according to the methods and rulings of Islam to those who have the right to receive it as specified in the *Quran*. Giving *zakat* is regarded as purifying one's wealth in order to receive Allah's blessing and grow in goodness. Meanwhile, charity is a voluntary act of giving money to all those in need in order to please Allah.
8. Savings: Islam encourages saving for future needs. Without savings, Muslims cannot perform *zakat* and charity. One can save as much as he likes as long as he gives to the poor, the needy, and the one who asks for help.
9. Reward: In Islam, self-satisfaction, benefit, and self-development are essential, but not to the degree that Islam values the afterlife. In the form of heaven and true achievement in eternal life, success goes far beyond these materialistic rewards. Allah says in the *Quran*: "And whatever you spend in good, it will be repaid to you in full, and you shall not be wronged...." (Al-*Quran*, 2:272).

Apart from understanding the fundamental principles of Islamic economics, every Muslim should also be aware of Islamic finance's fundamental and most critical features. *Riba, gharar, maysir*, and unlawful goods and services are all prohibited in Islamic finance.

Usury or interest is how the word *riba* is translated into English. Interest is expressly forbidden in Islam and is a major sin. *Riba* literally translates to "excess", "increase", or "growth". Technically it is defined as an excess over and above the principal of loan without any counter-value. Usurious transactions were categorised into two, namely *riba al-fadl* and *riba al-nasi'ah*. *Riba al-fadl* is generated when one of the six *ribawi* items (gold, silver, dates, wheat, salt, and barley) is traded for the same type of commodity with a different volume or weight. *Riba al-nasi'ah*, on the other hand, is the product of a selling transaction that unduly rewards one of the counterparties in the form of a surplus or extra sum as a result of a delay or failure to be immediate. The *Qur'an* mentions the prohibition on *riba* from the judgment of value, followed by an implicit prohibition, then a limited one and finally, a total and conclusive prohibition (*Al-Rum*, 30:39; *Al-Nisa*, 4:161; *Ali-Imran*, 3:130 and *Al-Baqara*h, 2:275).

Gharar is a broad term that literally means deception, risk, fraud, uncertainty, or hazard that could result in loss or destruction. Hanafi scholars describe *gharar* as something whose outcome is unknown. Scholars of the Shafi'i school characterized it as something hidden in its manner and consequence. Al-Sarakshi defined it as "anything that the end result is hidden or the risk is equally uncommon, whether it exists or not". Therefore, in Islam, *gharar* refers to any agreement in which the object's presence or description is uncertain due to a lack of details and understanding about the contract's ultimate outcome. *Maysir* literally translates to a gambling. It is a game of upheaval. All types of gambling are also forbidden in Islam. *Maysir* refers to the simple acquisition of wealth by chance, regardless of whether it deprives others of their rights. In *maysir*, people share a desire to gain return through deliberate risk-taking, as noted earlier in the *Quran*, Allah clearly prohibits gambling (*Al-Baqarah*, 2:219 and *Al-Maidah*, 5:93).

3. Research Methodology

This study is designed using a quantitative methodology. The data were collected by distributing the questionnaires to 411 Muslim women in Indonesia and Malaysia. The questionnaires consist of two parts; the first part is the demographic questions. The second part is true or false questions about the basic knowledge of Islamic and general financial literacy measured using the score on the correct answer.

4. Demographic Profile of Respondents

The total respondents collected for this study is 411. The participation of Indonesian women contributes 50.1%, and Malaysian women contribute 49.9% to this study. Respondents dominate this survey with the age of 23-29 years old, which contributes 64.5%. The majority of women in this study are single, 54.5%, followed by married women, 42.3%. Concerning education, most of the respondents hold a Bachelor's degree 56.0% and a Master's degree 34.8%. Lastly, the private employee, with 30.2%, dominates the occupation of the respondents.

Table 1: Demographic profile of respondents

Indonesian Respondents		Malaysian Respondents		Total percentage
Age	**Total**	**Age**	**Total**	
18-21	1	18-22	27	6.8%
23-29	135	23- 29	130	64.5%
30-45	65	30-45	42	26.0%
46 Above	5	46 Above	6	2.7%
Marital Status		**Marital Status**		
Single	81	Single	143	54.5%
Married	119	Married	55	42.3%
Widowed	6	Widowed	4	2.4%
Divorced		Divorced	3	0.7%
Education		**Education**		
Primary school	0	Senior High School	7	1.7%
Junior high school	0	Junior High School	3	0.7%
Diploma	9	Diploma	12	5.1%
Bachelor	118	Bachelor	112	56.0%
Master	74	Master	69	34.8%
PhD	5	PhD	2	1.7%
Occupation		**Occupation**		
Undergraduate Student	3	Undergraduate Student	60	15.3%
Postgraduate Student	30	Postgraduate Student	42	17.5%
Self-employed (Entrepreneur)	20	Self-employed (Entrepreneur)	8	6.8%
Civil Servant / government employee	22	Civil Servant / government employee	30	12.7%
Private employee	69	Private employee	55	30.2%
Housewife	40	Housewife	8	11.7%
Other	22	Other	2	5.8%
Monthly Income		**Monthly Income**		
Rp1.000.000-3.000.000	73	Less than RM 1000	90	39.7%
Rp3.000.000-5.000.000	67	RM 1,000- RM 3,000	63	31.6%
Rp5.000.000-10.000.000	36	RM 3,000- RM 5,000	41	18.7%
Rp 10.000.000-20.000.000	26	RM 5,000 & above	11	9.0%
Rp 20.000.000 & above	4			1.0%
Total	**206**	**Total**	**205**	**100.0%**

5. Results and Discussion

The questions to measure financial knowledge among women are divided into two parts. The first part is a question about the knowledge of Islamic finance. Six questions on basic Islamic finance, which consist of the Islamic method of finance, *gharar*, *mudharabah*, *zakat*, and *takaful*, were asked to measure Islamic finance knowledge. The second part is questions pertaining to general financial knowledge. Four questions consisting of the basic time value of money, speculation on investment, investment risk, and inflation were asked to measure the general knowledge of finance among women in Indonesia and Malaysia.

Table 2: Questions on Islamic and General Financial Knowledge

Construct	No	Items/ statements	Reference
Islamic Financial Knowledge (IFK)	1	Islamic method of finance is interest-free (True)	Antara et al. (2016)
	2	*Gharar* refers to any transaction in which its existence or description of the object is not certain due to a lack of information and knowledge on the ultimate result of the contract (True)	Ma'rifa Academy (2014)
	3	An Islamic financial institution may invest with you according to the profit-sharing method (*Mudharabah*) (True)	Antara et al. (2016)
	4	In *Mudharabah*, the capital provider is the only party that born the losses (True)	Antara et al. (2016)
	5	*Zakat* is a determined amount of wealth that is paid annually from a person's wealth according to the methods and rulings of Islam to those who have the right to receive it. How much is the amount of *nisab* for *Zakat Mal*? (85 gram of gold)	Ma'rifa Academy (2014)
	6	*Takaful* can provide coverage and benefits similar to conventional insurance (True)	Hassan R., et al. (2018)
	7	Suppose you put $100 into a (no fee, tax-free) savings account with a profit rate of 2.78% per year. You don't make any further payments into this account, and you don't withdraw any money. Once the profit is paid, your money in the account at the end of the first year would be $102.8 (True)	OECD (2016)
	8	Buying shares on a short-term price fluctuation is not speculation (False)	Antara et al. (2016)
	9	An investment with a high return is likely to be high risk/ or if someone offers you the chance to make a lot of money, it is likely that there is also a chance that you will lose a lot of money (True)	OECD (2016)
	10	Inflation does not affect the living cost (False)	OECD (2016)

Most women in both countries understand that Islamic finance is interest-free, which is indicated by question IFK 1. They also understand the definition of *gharar* and the profit-sharing method on *mudharabah* contract, which is shown by questions IFK 2 and IFK 3, respectively. However, despite knowing that *mudharabah* contract is using the profit-loss sharing method, only a few of them know that the capital provider in *mudharabah* contract (*rabbul maal*) is the one who bears the losses in the case of default (this is represented by question IFK 4). Although Muslims know the definition of *zakat*, in this study, less than half of the Malaysian women do not know the amount of *nisab* for *zakat mal*, which is 85 grams of gold.

For general financial knowledge, this study found that women in Indonesia and Malaysia still do not know how to calculate the basic time value of money. This result is represented by question GFK 1. However, most women in both countries have a good score when asked about investment speculation. The respondents also understand the consequence of high risk and high return on investment. Finally, most women in both countries also realize that inflation affects living costs. Muslim women in both countries have moderate financial knowledge, with the average scores for Indonesian women are 6.95 and Malaysian women are 6.54, respectively.

Table 3: Financial knowledge score

Item No	Questions	Indonesian Women	Malaysian Women
IFK 1	Islamic method of finance is interest-free (True)	195	170
IFK 2	Gharar refers to any transaction in which its existence or description of the object is not certain due to a lack of information and knowledge on the ultimate result of the contract (True)	167	150
IFK 3	An Islamic financial institution may invest with you according to the profit-sharing method (Mudarabah) (True)	192	179
IFK 4	In Mudarabah, the capital provider is the only party that born the losses (True)	**62**	**63**
IFK 5	Zakat is a determined amount of wealth paid annually from a person's wealth according to the methods and rulings of Islam to those who have the right to receive it. How much is the amount of *nisab* for Zakat Mal? (85 grams of gold)	133	**83**
IFK 6	Takaful can provide coverage and benefits similar to conventional insurance (True)	117	143
GFK 1	Suppose you put $100 into a (no fee, tax-free) savings account with a profit rate of 2.78% per year. You don't make any further payments into this account, and you don't withdraw any money. Once the profit is paid, your money in the account at the end of the first year would be $102.8 (true)	**80**	**47**
GFK 2	Buying shares on a short-term price fluctuation is not speculation (False)	130	157
GFK 3	An investment with a high return is likely to be high risk/ or If someone offers you the chance to make a lot of money, it is likely that there is also a chance that you will lose a lot of money (True)	184	172
GFK 4	Inflation does not affect the living cost (False)	171	177
	Islamic Financial Knowledge Average score	4.20 /6	3.84 /6
	General Financial Knowledge Average score	2.74 /4	2.70 /4
	Total Average	6.95 /10	6.54 4/10

Based on the financial knowledge score obtained in this study, the average score on Islamic financial knowledge among Indonesian women is 4.20, and the average for general financial knowledge is 2.74. Indonesian women obtained a total average score of 6.95. There are two questions that most Indonesian women are weak in—first, the understanding of the role of parties in *mudharabah* contract. Most Indonesian women understand that *mudharabah* contracts use the profit-sharing method, but only a few know the role of each party in *mudharabah* contract. The second area of their weakness is the time value of money calculation. When they were asked about the basic calculation of the time value of money, only 38% of the respondents answered correctly.

On the other hand, Malaysian women are weak in three questions. Similar to Indonesian women, they are weak in understanding the role of *mudharabah* parties and the basic calculation of the time value of money. Only 23% of Malaysian women answer the time value of money question correctly. In addition, most Malaysian women do not know the amount of *nisab* for *zakat mal*. Only 40% of them answer the question about the amount of *nisab* correctly.

Indonesian women were found to have slightly higher scores in Islamic financial knowledge. Indonesian women have an average score of Islamic financial knowledge 4.20 out of 6 questions, while Malaysian women obtained an average score of 3.84. However, both Indonesian and Malaysian respondents have the same average score on general financial knowledge of 2.74 and 2.70 out of 4 questions, respectively. The total average for both Indonesian and Malaysian women are 6.95 and 6.54 out of 10, respectively. It can be inferred that women in both countries have a moderate level of financial knowledge.

The result implies that Muslim women need to understand more about Islamic financial knowledge. Women in this study showed a low score when they were asked about the Islamic contract; the contract, in this case, is *mudharabah*. In addition, Muslim women may know the definition of *zakat*, but many of them do not know the amount of *nisab* for *zakat mal*. The knowledge about zakat is something that every Muslim needs to know because they are obliged to pay *zakat* when their wealth has reached the *nisab*. Muslim women also need to be taught the importance of understanding the time value of money. The time value of money will allow them to calculate their savings and investment. Women in this study were found to be weak in these three areas, namely *mudharabah* contract, *zakat*, and the time value of money.

6. Conclusion and Recommendation

Measuring financial knowledge is important to understand the level of understanding for both Islamic and general financial literacy. This study aims to measure the level of financial knowledge among women in Indonesia and Malaysia. Therefore, the area of strengths and weaknesses in financial knowledge can be identified.

Indonesian Financial Authority (OJK, 2019), Messy and Monticone (2013), and Sawandi et al. (2018) stated that women have low financial literacy. Furthermore, a study by Mohta and Shunmugasundaram (2022) found that female respondents have acute financial illiteracy. However, the study found that Muslim women in Indonesia and Malaysia have moderate Islamic and general financial knowledge. This finding does not support the previous studies and reports by OJK that women have low financial literacy levels. Although the finding challenges the previous report that stated a low level of financial knowledge among women, a continuous learning program by considering strengths and weaknesses still needs to be taken to improve the financial literacy among women.

Women in Indonesia and Malaysia were found to have a moderate level of both Islamic and general financial knowledge. In a rough score, women in both countries have four correct answers out of six Islamic financial knowledge questions and three correct answers out of four general financial knowledge questions. Both scores weight 67% and 75% of the total questions, respectively. It can be concluded that both Islamic and general financial knowledge among women in Indonesia needs to be improved.

Several areas of weaknesses found in this study are; the understanding of the role of parties in *mudharabah* contract, knowledge about *zakat*, and the simple time value of money calculation. These three areas of weakness could be emphasized in the financial education program. Understanding the *mudharabah* contracts and the role of its parties is important when women are intended to invest in a particular *mudharabah* project or in an Islamic banking product that is offered with such a contract. Knowledge about zakat also reflects the understanding of Muslim's obligation on their wealth. Lastly, it is also essential for women to understand the time value of money to estimate their profit on some investments or savings and even avoid financial scams.

Besides the significant efforts made to achieve the research objectives and answer the research questions, there have been inevitable limitations due to time constraints. This study can be expanded to explore the antecedents and the outcomes of financial literacy among Muslim women. The sample of this study focuses on women in Indonesia and Malaysia; therefore, the findings of this study could not be generalized to other women in other countries. Regarding the sample size limitation, the researcher suggests a larger respondent for future research. The larger sample size would indicate a larger population of Muslim women, and the generalizability issue would be resolved. More questions related to Islamic and general financial knowledge also could be asked to observe more areas of strengths and weaknesses among women. Therefore, financial literacy programs can focus more on increasing financial knowledge that women still do not widely understand.

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The Role of *Istihsan* in Applying *Maslahah* in Islamic Finance

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Abstract

This paper identifies the role of *istihsan* in Islamic finance that should be emphasized to strengthen the element of *Shariah* compliance. Over the period, it is argued that applying *Shariah* rulings in Islamic finance has witnessed several challenges and difficulties resulting in some aspects may need toleration for the sake of *maslahah*. The data of this study is based on library research, by referring to classical and contemporary books of *usul fiqh*, academic and non-academic works and related resolutions from the BNM and SCM. The findings reveal that the role of *istihsan* can be manifested through providing an exceptional ruling from general rulings, considering modern norms of business practices before applying rulings, harmonizing between *Shariah* and civil laws, and adapting Islamic finance within the change of circumstance. While this study utilizes limited secondary data as well as it focuses on Malaysia, it engages with the real Islamic finance issues in this country. Thus, this study is hoped to benefit many parties who involve directly and indirectly in this industry, particularly to deeply understand the application of *Shariah* principles in Islamic finance.

Keywords: *istihsan, maslahah, Islamic finance, Islamic banking*

1. Introduction

In general, *usul fiqh* (principles of Islamic jurisprudence) manifests a special discipline in extracting rulings from *Shariah* sources: the *Qur'an* and the *Sunnah*. This discipline reflects principles and methodologies to deal with both sources since they always come up with different approaches in establishing rulings. Furthermore, *usul fiqh* provides a special guideline in dealing with issues that are not mentioned in the *Qur'an* and the *Sunnah* in detail. While both of them are recognized as the highest authority in *Shariah*, additional sources have been founded as a supportive tool for implementing *Shariah* rulings. These sources are also based on general principles laid by the *Qur'an* and the *Sunnah*. In other words, all *Shariah* rulings are derived from one source which is the God revelation, however, their implementation could be different, depending on methodologies and principles applied by scholars.

In fact, determining *Shariah* rulings on specific issues must be carried out through the appropriate application of *usul fiqh*. This includes modern Islamic finance that is more challenging and complicated. Realizing the importance of this discipline, Bank Negara Malaysia (BNM), the highest and sole authority for Islamic finance matters in Malaysia has required all Islamic financial institutions to appoint their *Shariah* committees who hold bachelor's degrees in *Shariah*, which includes the subject of *usul fiqh* (BNM, 2019). In fact, this requirement is essential so they can understand *Shariah* principles comprehensively before engaging with any issue in the area of banking, finance, business and economy. Furthermore, *Shariah* officers who serve within Islamic financial institutions must also understand *usul fiqh* so as it can enable them to review products, manage related risks, conduct audits and provide special reports to *Shariah* committees (Mat Zain et al., 2020).

Among the vital topic under *usul fiqh* is *istihsan* (juristic discretion) which can be defined as an exception to a general rule, in respect of a specific matter, due to the specific *maslahah* (Al-Durī, 2001). In general, all rulings in Islam must be implemented comprehensively regardless of the place, time or situation. This is important to ensure the consistency of *Shariah* (Ishak, 2018). However, in a particular situation, a ruling might

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not be able to be implemented like its theoretical discussion. This is due to some circumstances might affect the outcome of the ruling; thus, an exception must be provided (Al-Kailānī, 2008).

With regard to modern banking operations and financial activities, it is argued that many *Shariah* rulings can, in general, be implemented. Many *Shariah*-compliant contracts can be adopted as an alternative to conventional practices so as the element *riba* (usury), *gharar* (uncertainty) and *maisir* (gambling) can be removed (ISRA, 2010). However, as a new industry which is struggling to survive in the modern financial environment, some situations might need to be tolerated for the sake of the sustainability of Islamic finance industry. In this regard, some practices are allowed to preserve the more important *maslahah* (well-being) (Ishak, 2019b).

Among the related resolutions that clearly mention the term *istihsan* is Regulated Short Selling (RSS) for designated *Shariah* compliant shares which can be understood: selling securities without holding them at the time of the transaction. It can be illustrated when investors anticipate the drop of the price of their shares, so they sell them immediately, let say at RM 5 (which they do not own) and buy back those shares at a lower price e.g., RM 3 to close the position. In this case, investors actually borrow those shares, under the concept of *ijarah* (leasing contract), from the brokerage house for the purpose of selling (ISRA, 2015). The gap between the selling price and the purchasing price in this case RM 2 would be the profit for investors. Shariah Advisory Council of the Securities Commission (SAC SC) has resolved that the permissibility of RSS is based on the concept of *istihsan*. In general, *ijarah* would be terminated if there is a sale and purchase involving the leased asset. However, this case is analysed based on *istihsan* in which the lessee is allowed to sell their shares: the leased asset to the third party, with consent from lessors and they, should return back those shares. In this case, the *istihsan* was based on *maslahah* in terms of providing liquidity for the share market (SCM, 2016).

While many examples of exceptions from general rulings have been applied, justifying them with *istihsan* is very limited. It can be understood that the term *maslahah* seems to be more popular, despite the fact that *usul fiqh* does not consider *maslahah* to be a *Shariah* source. At the same time, it should be noted that not all schools of thought accept *istihsan* as their source of *Shariah* rulings, even this term seems to be portrayed in a negative way like what had been said by Imam Shafii "*Istihsan* is seeking for the pleasure" (Al-Shafiʿi, 2005).

Thus, this study identifies specific roles of *istihsan* that should be emphasized through the application of *maslahah* in Islamic finance. In fact, *istihsan* should be promoted as a tool of harmonization between revelation and reality. Also, this source provides a clear parameter in terms of the application of *maslahah* so that it does not go against the *Shariah.* In terms of methodology, as this research is a conceptual review, the data are based on secondary including classical and contemporary literature in *usul fiqh*, academic and non-academic materials and related resolutions from the SAC BNM and SAC SCM. Even though this method is limited in some aspects, it is sufficient as an exploration of the philosophy behind the implementation of *istihsan* within Islamic finance.

2. The Concept of *Istihsan* in Islam

Istihsan literally means: to consider something better or to be better. As for its technical meaning, the term can be defined by the majority of scholars as an exception from a general ruling, in respect of a specific matter, due to the specific *maslahah* (Al-Shatibi, 2004). In more detail, *istihsan* provides an exception of *Shariah* ruling, in a certain situation because of *maslahah*. In fact, any *Shariah* ruling must be implemented completely based on *Shariah* texts, regardless of individual, place or time. However, in a certain situation, since the general application of the ruling could not achieve *maslahah,* then the exception must be provided (Al-Kailānī, 2001). This is the concept of *istihsan* according to the majority of scholars.

However, Hanafis come up with a different definition for *istihsan* as it is understood as a departure from *qiyas khafi* (unclear analogy) to *qiyas jali* (clear analogy) in favor of a ruling if the former brings hardship for people (Al-Sarkhasi, 1993). In other words, *istihsan* aims to review the current application of *qiyas* so as the decision issued in line with current *maslahah.* For example, declaring land as a *waqf* (endowment) does not involve the right of passage; the right of water; and the right of flow, unless these items are clearly mentioned. This is based on *qiyas* by comparing between *waqf* and *bay'* (sale). However, this result could cause hardship in practicing *waqf* because of the need for the land. Thus, it is more practical to compare *waqf* as *ijarah* since both aim to transfer the usufruct, as those items must be included regardless of whether they are mentioned or not (Kamali, 2016). This concept of *istihsan* is popular among the Hanafis, even though they prioritize it over the *qiyas.*

Even though the two groups provide two different technical definitions of *istihsan* in which the scope of the majority is wider than the Hanafis, both groups agree that *mujtahids* (a person who has the ability to issue *Shariah* ruling) must be careful in applying any *Shariah* ruling on a certain issue. Sometimes, the ruling is either based on the verse of the *Qur'an*, or the text of the *Sunnah*, or the application of *qiyas* needs to be reconsidered because of *maslahah* (Al-Kailānī, 2001). Through the concept of *istihsan*, *mujtahids* must not be too literalist in understanding *Shariah* texts of the *Qur'an* or the *Sunnah* and *Shariah* general principles, as in certain situations an exception must be provided for the sake of *maslahah* as well as to ensure *Shariah* rulings are always applicable (Kamali, 2016).

In this regard, *istihsan* plays a significant role in providing an exception from *Shariah* ruling to preserve *maslahah.* This exception must be supported by *Shariah* sources. For example, *salam* (forward selling) is an exemption from the general ruling of prohibition of selling something non-existent since this contract brings specific *maslahah* to the society (Cerimagic, 2010). Thus, *istihsan* plays a prominent role in adapting *Shariah* rulings when the situation has changed. This method is vital to avoid rigidity due to the literal practice of the existing ruling. In fact, *sahabah* (companion of the Prophet PBUH) were issuing their view on religious matters based on the objective of *Shariah*, rather than being a literalist (Kamali, 2016).

Nevertheless, not all scholars agree with the authority of *istihsan* as a *Shariah* source. On one hand, it is recognized by the Hanafis, Malikis, and Hanbalis as one of their main approaches in dealing with issues that need alternative views. As for this group, several rulings in the *Qur'an* come up with exceptions when they could not be applied because of circumstances as Allah never intends to bring difficulties through His rulings (Sya'ban, 2008). On the other hand, a group of *Shafi'is* and *Zahiris* view applying *istihsan* on *Shariah* matters means to recognize logic as its source, which is resulting in determining a ruling based on seeking pleasure (Al-Amidi, 2005). They argue *Shariah* rulings must be in accordance with the revelation; either the *Qur'an* or the *Sunnah*. Also, based on history, if the revelation is postponed, the Prophet (PBUH) was still waiting for it, without determining based on his logic (Abū Zahrah, 1958).

It is learned that the clash between the two groups is not too serious since they have different interpretations of *istihsan*. While *istihsan* is accepted by the proponent with strict parameters, the opponent views the concept of *istihsan* is based on its literal meaning: to consider something better. As a result, the latter has condemned *istihsan* that it may be misused to issue a *fatwa* based on logic and desire (Zuhaili, 1986). In fact, this group also applies *istihsan* indirectly, even though they did not name it. For instance, al-Shafi'i in dealing with the issue of earlier payment for *zakat fitrah,* he also applied an exception. In general, every *ibadat* (worship) must be carried out at a specific time, such as *solat*, *siyam* (fasting) and *hajj*. However, in the case of *zakat fitrah*, al-Shafi'i has allowed those who wished to pay two or three days earlier, before the day of *ʿAid* (the fast-breaking celebration) to avoid difficulty among Muslims. In this case, although al-Shafiʿi did not accept *istihsan*, he still considered providing an exemption of a general ruling in a particular situation, by considering a certain circumstance which is the concept of *istihsan* that is applied by others (Al- Miqdādī, 2010). In this regard, some scholars argued that since the exemption from a general ruling is also based on *dalil* (evidence) or *maslahah,* then there is no need to name it as an independent method like *istihsan* (Sayyīd Ūbak, 2012).

3. Parameters of *Istihsan*

In general, *Shariah* clearly distinguishes between permitted actions and prohibited ones. The former is allowed because they bring *maslahah* while the latter is prohibited due to its *mafsadah* (harm). Nevertheless, several factors such as unusual situations and different intentions could significantly affect those actions. For example, a permitted action may be misused by some people for their bad intentions to reach the prohibited end, thus, a permitted thing should be banned when it leads to *mafsadah.* In contrast, a prohibited action may need some tolerations in certain aspects since banning the action totally could bring a bigger *mafsadah* (Al-Shatibi, 2004).

Thus, *istihsan* plays a role in providing an exceptional ruling by considering the *maslahah.* This approach is vital for the sake of harmonizing between revelation and reality. On one hand, *istihsan* provides flexibility so as *Shariah* rulings can be applied within the change of reality. With the application of *istihsan* an exception would be provided for certain cases. On the other hand, because of its flexibility, some scholars are concerned that over-considering *istihsan* could lead to ignoring *Shariah* rulings under the name of *maslahah* (Kamali, 2016).

Thus, to avoid such negative consequences, *istihsan* must be applied within strict parameters, as follows:

a. Considering *maslahah* must be genuine.

Applying an exceptional ruling based on *istihsan* requires *maslahah* on certain areas to be proven strongly. In other words, this *maslahah* must not be imaginary, but genuine (Laldin, 2010). This is essential to ensure the consistency of *Shariah* rulings. For example, *Shariah* prohibits the selling of something non-existent as well as something probably existent, based on several *Hadith*, for example, the Prophet (PBUH) was reportedly said: "Do not sell what you do not possess" (Al-Sijistani, 2010).

This ruling is understandably aims to avoid disputes between sellers and buyers, particularly when the item is non-existance at the time of sale. Nevertheless, there are many transactions that are given as exceptions from general *Shariah* rulings (Lahsasna, 2013). For example, *salam* (forward selling) and *istisna'* (manufacturing contract) as both contracts in fact are contrasting with the general ruling that selling something non-existence is prohibited. Even though their items do not exist on the day of the contract, *maslahah* of both contracts are more significant in supporting economic activities because they provide financial aid for small business owners as an alternative to a loan that would render them helpless in the future (Cerimagic, 2010). Moreover, it can be understood that the former is prohibited because of the element of *gharar*, when the sellers are unable to deliver the items to their customers (Al-Hadād, 2015). Nevertheless, this element is overcome through *salam* and *istiṣna'* in which they provide clear conditions for contracting parties in terms of future items, then it should be acceptable. Such conditions are: the price must be clearly determined; the commodity must be clearly specified in terms of its quality and quantity; the date and place of delivery must be specified (Al-Zuhaili, 2006).

b. *Istihsan* must be based on *Shariah* sources.

It is unanimously agreed that *maslahah* must be established from *Shariah* sources because it is not a new source, but something that presents a comprehensive view of *Shariah*. In this regard, applying *istihsan* on prohibited actions that their ruling is clearly mentioned in the Qurʿan or the *Hadith* should not be merely justified in the name of *maslahah* without *Shariah* evidences (Al-Qarḍāwī, 2005). Otherwise, it might devastate the religion gradually for the sake of 'the way of the world'. Moreover, it is unacceptable to claim that there is a clash between *maslahah* and Islamic rules, since the latter are revealed for the sake of human well-being (Al-Qarḍāwī, 2005).

Therefore, *istihsan* should not be considered as an independent source. Over the period, Muslim scholars have developed this method with strong supports, so as *istihsan* must be applied based on *Shariah* sources. For example, allowing *salam* is part of *Sunnah* based on *istihsan*, because there is a specific *Hadith* that supports this contract. Another example would be *istisna'* contract which is allowed based on *ijma'* (Ibn Munzir, 1999). Additionally, *urf* based *istihsan* is applied in the case of allowing moveable *waqf* because society has recognized this practice (Ishak et al., 2021). Finally, *istihsan* is based on *maslahah* and imposing a fine on craftsmen for loss or damage towards customers' property (Al-Khādimī, 2010).

c. Considering *istihsan* must not change the original ruling.

Subsequently, considering *istihsan* must not change *Shariah* mandatory rulings. Since *istihsan* is applied to provide an alternative implementation of a *Shariah* ruling in an unusual situation, the status of the ruling should not be amended (Al-Raisūnī, 2009). For example, Muslims in non-Muslim countries may be allowed to utilize conventional banking institutions to fulfil their need in buying home. This is due to limited access to Islamic banking services in their area (EFCR, 2010). However, this permissibility must not change the status of *riba* (usury) in Islam.

In fact, scholars have no authority with regard to *Shariah* rulings, instead their role is limited to determining the implementation of those rulings in the right situation. In the situation that some ruling might be incapable to be implemented, it does not mean that those rulings are irrelevant, but that the environment needs to be improved first (Ishak, et al., 2021). In this regard, *maslahah* should not justify the means by the ends (Al-Ashqar, 2009).

4. *The Role of Istihsan in Supporting the Application of Maslahah* in Islamic Finance

As mentioned before, *istihsan* is not an independent source, instead it aims to support the application of *maslahah* in dealing with *Shariah* rulings. The role of *istihsan* in Islamic finance can be manifested as the following: -

4.1. To provide an exceptional ruling from Shariah general rulings.

In general, *istihsan* aims to ensure *maslahah* can be achieved through the implementation of *Shariah* rulings. Even though the area of *muamalat* (financial transactions) pertaining to *Shariah* rulings in financial, business and commercial activities are not new among classical scholars, modern issues seem to be more complicated. In fact, Islamic finance is operating under the 'conventional financial framework' (Bakar, 2020). As a result, its environment is claimed not to be too conducive to its progress. Civil laws, market circumstances, customer awareness and insufficient human capital are among the challenges for Islamic financial institutions (ISRA, 2010). Thus, for the sake of *maslahah*, several aspects which are deemed prohibited in general should be tolerated in certain situations with strict requirements.

Late payment penalty could be a practical example to illustrate this point. According to the *Qur'an* (verse 3:130), it is forbidden to impose late charge as it is part of *riba jahiliyyah* (deferred usury): when the debt becomes due, creditors give two options to their debtors: to pay it now or to pay later with additional payment (Ibn Kathīr, 2008). Therefore, Islamic financial institutions should not charge late payment for their customers because it looks similar to *riba*.

Nevertheless, abolishing this charge could directly affect their functions as financiers, in terms of incurring extra expenditures, such as the cost of issuing notices and letters, legal fees and other related costs, as they also utilize their depositors' funds (BNM, 2015). Thus, *istihsan* needs to be applied to provide an exception on this issue in order to sustain the viability of Islamic finance industry. Nevertheless, Islamic financial institutions must ensure the implementation of late payment penalty is different from the practice of *riba*. This includes being more precaution in this matter of recognizing only the actual loss and ensuring the accumulated late payment amount should not be more than the outstanding principal (Ishak, 2019a).

4.2. To consider the modern norm of business practices before applying a ruling

Based on the literature, *'urf* (custom) is widely recognized as one of vital *Shariah* sources. Considering *'urf* means facilitate people life as changing their habit matters or norms may bring difficulties (Ishak et al., 2021). In this regard, many *Shariah* rulings are based on *'urf*. In fact, *istihsan* has a strong relationship with *'urf*. For example, *urf* based *istihsan* is applied in the case of allowing moveable *waqf* because the society has recognized this practice. One of the main references of *istihsan* is '*urf*. In the case of business activities, the term *urf tijari* (customary business practice) is recognized among an important *'urf* and *istihsan* needs to be applied in certain situations to facilitate businesses (Che Abdullah and Ab Ghani, 2014).

In modern times, the case of T+2 in currency exchange could illustrate the role of *istihsan*. According to *Shariah* ruling, the exchange of different currencies must be carried out immediately. Nevertheless, in modern financial practice, this transaction could not be exercised on the spot as its process requires two working days, called as T+2 settlement (BNM, 2017). At the same time, it should be noted that the definition of a covenant ceremony focused on the "same place" factor is seen as less relevant to current practice as most *bay' al-Sarf* (currency exchange). In fact, currency exchange through banking activities do not involve physical meetings in the same place, but only online or via electronic platforms. Thus, a contract session could be alternatively defined as the period commencing from the offer and acceptance by the contracting parties and ends by the disengagement either via physical meeting or through telephone, chatroom or electronic platform of the contracting parties (BNM, 2017).

Hence, *istihsan* is needed to give a new definition of contract session in which contract session also should fulfil the criteria of mutual waiving of the rights to revoke the contract by the contracting parties. Any delay of the payment due to unexpected disruption is also allowed. Operationally, this session may take longer time than the normal contract session which is up to T+2. The rationale for the delayed settlement is to give time for the contracting parties to get documents and to clear the funds required which also includes documents verification, approvals and completion of transaction by the system.

4.3. To harmonize Shariah with the current civil law

On one hand, Islamic finance has successfully attracted many financial institutions to open Islamic branches within their operation. Additionally, it has triggered many countries, particularly non-Muslim majority countries to amend their civil law so as Islamic finance can be adopted as alternative finance in their financial system (ISRA, 2010). Nevertheless, this change is still in the infant stage as in fact Islamic finance needs to operate under civil law that has been dominated by conventional finance framework. For example, banking institutions act as financial intermediaries as they 'create' money from their depositors in the form of credit to others (Jaffar et al., 2017). Since Islamic banks are part of financial intermediaries but operate under *Shariah* principles, they are not allowed to create money from lending and borrowing activities with interest. Alternatively, *Shariah* contracts like *bay'* (sale), *ijarah* (lease) and *musharakah* (partnership) should be designed as financing so as they can provide alternatives for customers.

Among the example to illustrate this point is the practice of Islamic Hire-Purchase or *Al-Ijarah Thumma Al-Bay'* (AITAB) by Islamic financial institutions in Malaysia. This product is based on *ijarah* contract modified to be a financing product like conventional hire purchase. Based on the general ruling of *ijarah,* any cost that arises from the ownership of the leased asset should be borne by the owner. This includes the risk associated to the asset, as well as the obligation of the ownership of it. In this regard, SAC BNM comes up with a resolution that the owner must bear the costs of maintenance as well as *takaful* coverage of the asset, not the lessee. However, SAC allows the owner to appoint the lessee as his agent to bear them as at the end of the leased period, those costs would be reduced in the sales transaction (BNM, 2010).

It is argued that bearing maintenance by lessees in *ijarah* can trigger *Shariah* issue. Obviously, the current practice of AITAB financing in Malaysia witnesses Islamic banks merely act as a financier, rather than the lessor (Azma et al., 2014). However, since Hire Purchase Act 1967 has become the governing law for AITAB, it is vital to harmonize with it since the Act is considered as *urf* in practicing hire purchase (Awang and Asutay, 2017). Furthermore, it is learned that the costs are not truly transferred to the lessee, but they would be offset in the sales transaction of the asset at the end of the leased period. As for *takaful* coverage, since the purpose of taking coverage is to protect the lessee from any risk, damage, or injury related to the utilization of the asset, then the payment should be borne by the lessee (Tag El-Din and Abdullah, 2007).

4.4. To adapt Shariah rulings into the current reality

Understanding the reality is part of the fundamentals to deal with *Shariah* rulings. In fact, different situations may significantly determine the consequences of these rulings when they are implemented. While scholars have to work hard to understand Islamic sources, they have to study the current reality too, including human needs, their customs, and new matters in their life (Al-Najjar, 1989). With regard to business, finance and economy, these areas are dramatically changing due to the change within the society and nation. The current situation is essential to be mastered before applying *Shariah* since it is related to *maslahah.* The approach shown by the Caliph Ali bin Abi Ṭalib could be the best example in this case when he has changed the previous ruling towards craftsmen. Before his period, customers were not compensated for the mistake done by craftsmen. Nevertheless, the caliph has ordered to change this ruling when some craftsmen took their customers for granted (Al-Khādimī, 2010).

The case of floating rate in modern financing could be one of practical examples for the role of *istihsan* in adapting Islamic finance in current reality. In modern economic environments, fixed-rate financing might affect the competitiveness of banking institutions. In more detail, if the interest rate is increasing, customers would choose the fixed-rate financing facility, but when it goes down, some of them might convert their financing to floating for a relatively lower payment (Ishak and Mohammad Nasir, 2021). In general, financing in Islamic banks must be structured with a fixed rate to avoid the element of *gharar* (uncertainty) in price. It can be understood that *gharar* occurs when a commercial contract contains elements that are unknown and ambiguous in its substance or lead to unknown results (Ishak and Mohammad Nasir, 2021).

Nevertheless, considering the above *maslahah* which is genuine, it is suggested that Islamic financial institutions should prefer variable rate financing along with ceiling rate to avoid *gharar.* This can be justified by applying *istihsan* in which an exception needs to be provided by offering two different prices in a contract: the selling price that will be considered as ceiling price and the price calculated against the specific rate (Lahsasna, 2014). The first ceiling price could overcome the issue of *gharar* that is prohibited due to uncertainty that can lead to disputes between contracting parties. As far as the two prices that are clearly mentioned, then it should be allowed, particularly to sustain the Islamic banking industry.

5. Conclusion

This paper identifies the role of *istihsan* should be emphasized to support the current practices of Islamic finance in Malaysia, particularly to ensure those practices are in compliant with *Shariah*. It is learned that applying *Shariah* rulings through Islamic finance has witnessed various challenges as some aspects may need to be tolerated. However, this process must be carried out appropriately within *Shariah* disciplines. Since *maslahah* is applied in many areas to harmonize between revelation and reality, this process requires strict conditions to avoid 'ends justify the means'.

Based on library research, the findings reveal that several roles of *istihsan* in supporting the application of *maslahah* in Islamic finance issues are identified. Such roles are providing an exceptional ruling from *Shariah* general rulings, considering the norm of business practices in applying rulings, harmonizing between *Shariah* rulings and current civil laws and adapting Islamic practices within the change of reality. Late payment penalty, maintenance coverage in *ijarah*, exchange currencies and floating rate are among the issues that need *istihsan* perspective to strengthen the application of *maslahah* on them.

All in all, despite this study is considered as a conceptual review, its finding discusses real issues that occurred in Malaysia so that its findings can benefit many parties who involve directly and indirectly in this industry. Therefore, future studies are suggested to focus on the empirical side.

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