A SMART SHARIAH-BASED DECISION-MAKING IN ISLAMIC FINTECH

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Abstract: *This paper investigates the development of a robo advisor in Islamic fintech institutions that incorporates Shariah-based decision making. The WOS and Scopus databases were used to collect data from the literature review, which was conducted using multiple keywords. Shariah-based decision making is an important component of Islamic finance, and the creation of a shariah robo-advisor can assist investors in making investment decisions that are consistent with their values. Investment decisions and objectives should be aligned with shariah principles and the user's values. Shariah screening criteria entail identifying industries that are haram (forbidden) under Islamic law and industries that are halal (permissible). The algorithm for a shariah robo-advisor was designed to screen investments based on shariah principles and provide investment advice that aligns with the user's investment objectives while taking factors such as the company's source of income, the nature of the business, and the use of debt in the company's operations into account. By bringing the framework of shariah to the forefront of technology, and Islamic Finance studies through an interdisciplinary approach, it is not a fey subject. This analysis, on the other hand, revealed that proposing a new development of a shariah robo-advisor involves several important steps, including defining investment objectives, developing shariah screening criteria, designing the algorithm, testing the algorithm, and launching the robo-advisor from the Malaysian Islamic Fintech context was still unexplored and merited more attention, given its potential benefits.*

Keywords: *Islamic FinTech, Shariah Robo-advisor, Islamic Finance, Malaysia.*

1. Introduction

Robo-advisory is a digital platform that provides automated investment advice to clients based on their financial goals and risk tolerance. The development of robo-advisory was traced back to the early 2000s, when the first online investment platforms were launched (Kasim, & Che Azman, 2023). However, the concept of robo-advisory as we know it today was founded by Betterment, a US-based robo-advisory firm, in 2008.

According to Salim and Alhabshi (2020), from a Shariah and Islamic finance perspective, robo-advisory offers several benefits. One of the key principles of Islamic finance is the prohibition of riba (interest), which means that investments must be made in a way that avoids interest-based transactions (Selmier, 2018). Robo-advisory helps in this regard by providing investment portfolios that are screened for Shariah compliance. These portfolios were designed to exclude investments in companies that engage in activities that are prohibited in Islam, such as gambling, alcohol, and tobacco (Ramazan, Mansur, & Obiyathulla, 2018).

2.   Methodology

The development of an Islamic finance shariah-compliant robo-advisory is critical for the growth of this new financial service. As discussed in this paper, the components should include Shariah compliance, investment portfolio design, risk management, investor profiling, technology infrastructure, and ethical and social responsibility. Islamic finance shariah-compliant robo-advisory can help to promote financial inclusion and provide investors with a halal and socially responsible investment option by developing a framework aligned with Shariah law principles, Tahat, Ahmed, and Alhadab (2018).

This paper aims to explore from literature on the development of a robo advisor that incorporates shariah-based decision making in Islamic financial institutions. Results from the literature review, conducted using multiple keywords, were collected using the WOS and Scopus database from 2015-2023. Robo advisors are digital platforms that provide investment advice based on algorithms. The use of robo advisors in Islamic finance presents an opportunity to provide efficient and compliant investment advice. Shariah-based decision making is a critical component of Islamic finance, and the development of a shariah robo-advisor helps investors make investment decisions that are in line with their values.

3.   Literature Review

Robo-advisors have emerged as a key innovation in the field of financial technology (FinTech), offering automated, algorithm-based financial planning services with little to no human supervision (Oseni & Ali, 2019). In recent years, the concept of Shariah-compliant robo-advisory services has begun to gain traction within Islamic finance, a segment of finance that adheres to the principles of Islamic law (Shariah), Obaidullah (2021). This literature review aims to explore the existing body of knowledge surrounding Shariah robo-advisory services for investment decision making.

A robo-advisory guides investors in Islamic finance to diversify their portfolios, which is an important principle in Islamic finance. This is because diversification helps to reduce risk and increase returns, which is important for investors who are looking to achieve their financial goals in a halal manner.

Several studies have been conducted on the use of robo-advisory in Islamic finance. For example, Mohd. Zain, Hassan and Ismail, (2019); Oseni and Ali (2019) found that robo-advisory increases the accessibility and affordability of Islamic finance products, which in turn promotes financial inclusion. Another study by Obaidullah (2021) found that robo-advisory provides investors in Islamic finance with greater transparency and control over their investments.

The development of robo-advisory has provided investors in Islamic finance with a new and innovative way to invest their money in a halal manner. According to Mohd Haridan, Sheikh Hassan, Mohammed Shah, and Mustafa, (2023), by providing access to Shariah-compliant investment portfolios, robo-advisory promotes financial inclusion and provides greater transparency and control to investors in Islamic finance.

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3.1   Islamic Finance Shariah-Compliant Robo-Advisory

Islamic finance has gained significant attention in recent years as an alternative financial system to conventional finance. As coined by Mohamed and Ali (2018), Islamic finance principles are based on the principles of Shariah law, which prohibits interest-based transactions and promotes ethical and socially responsible investments. Shariah-compliant robo-advisory is a new concept that combines the principles of Islamic finance with the technology of robo-advisory (Mat Rahim, Mohamad, Abu Bakar, Mohsin, & Md., 2018).

Shariah-compliant robo-advisory components for Islamic finance can guide this paper to a clear understanding of the various components involved in this new financial service. As such, the Islamic finance shariah-compliant robo-advisory may include the following components: (1) Shariah-compliance, (Mohd Haridan et al., 2013); (2) investment portfolio design, (Sa'ad, Alhabshi, Mohd Noor, & Hasan, (2020); (3) risk management, (Salim & Alhabshi (2020); (4) investor profiling, Selmier (2018); (5) technology infrastructure, (Salim & Alhabshi (2020); and (6) ethical and social responsibility, (Tahat, Ahmed & Alhadab, 2018).

According to Salim and Alhabshi, the most important component of the Islamic finance shariah-compliant robo-advisory is Shariah compliance (2020). The investment portfolios provided by the robo-advisory platform must adhere to Shariah law principles. This includes refraining from investing in prohibited industries such as gambling, tobacco, and alcohol, as well as ensuring that investments are made in a halal manner.

The investment portfolio design component entails the creation of investment portfolios that are tailored to the needs and preferences of the investors. This includes deciding on asset allocation, security selection, and rebalancing strategy. Investment portfolios must be designed in a way that maximises returns while adhering to Shariah law principles. Selmier (2018).

The risk management component, according to Salim and Alhabshi (2020), entails the development of risk management strategies that are aligned with Shariah law principles. This includes ensuring that investment portfolios are diverse and that risk management strategies are designed to reduce investment risks.

The investor profiling component entails the creation of a process for profiling investors and their investment preferencesm, according to Selmier (2018). This includes determining their risk tolerance, investment objectives, and other pertinent information that can aid in the development of investment portfolios tailored to their specific needs.

The development of the technology platform that supports the robo-advisory service is part of the technology infrastructure component (Salim & Alhabshi) (2020). This includes the creation of algorithms used to generate investment portfolios, as well as the creation of the user interface and back-end systems.

Finally, the ethical and social responsibility component entails making certain that the investment portfolios are both ethical and socially responsible. According to Mat Rahim et al., 2018; and Fazmi (2019), the component includes avoiding investments in industries that harm the environment or violate human rights, as well as ensuring that investments are made in a way that promotes social responsibility.

4. Discussion

4.1 Shariah Robo-Advisory Services for Investment Decision Making

Creating a Shariah-compliant robo-advisory service necessitates a well-designed algorithm that can take into account Islamic finance and Shariah law principles. According to Kasim and Che Azman (2023), the proposed algorithm includes gathering investor information (Khan, 2019), determining Shariah compliance criteria (Gazali, Jumadi, Ramlan, & Rahmat, 2020), screening the investment universe (Khan & Rabbani, 2020), designing the investment portfolio (Li, 2018; Lin, 2019), monitoring and rebalancing the portfolio (Obaidullah, 2021), and reporting performance (Aseni & Ali, 2021).

A Shariah-compliant robo-advisory service that follows this algorithm can provide investors with a halal and socially responsible investment option that is tailored to their financial goals and risk tolerance.

4.2 A source code and algorithm for determining Shariah compliance criteria

A Python script, as shown in Figure 1, is created to create a source code and algorithm for determining Shariah compliance criteria. This script takes financial data and business information as input and returns a boolean value indicating whether a company is Shariah-compliant or not.

This script defines the function 'is shariah compliant,' which takes a business activity and financial data as input and returns a boolean value indicating whether the company is Shariah-compliant or not. The following example demonstrates how to use this function to determine the Shariah compliance status of a company (Mohd Zain, Hassan & Ismail, 2019).

Developing a Shariah-compliant robo-advisory service necessitates the use of a well-designed algorithm that takes Islamic finance and Shariah law principles into account (Meredith, 2019; Saad, Alhabshi, Mohd Noor & Hasan, 2020). The proposed algorithm collects investor information, determines Shariah compliance criteria, screens the investment universe, designs the investment portfolio, monitors and rebalances the portfolio, and reports performance. This algorithm, when used by a Shariah-compliant robo-advisory service, can provide investors with halal and socially responsible investment options tailored to their financial goals and risk tolerance.

One of the main challenges in implementing Shariah robo-advisory services is ensuring the accuracy of Shariah compliance filters. These filters must be able to accurately identify and exclude non-compliant investments, which requires extensive knowledge of both Islamic law and the specific details of various investment opportunities (Saad etal., 2020).

There are also potential issues related to the acceptability of robo-advisors within Islamic culture. The use of automated systems for financial advice may conflict with the Islamic emphasis on personal relationships and face-to-face interactions in business dealings (Meredith, 2019).

```
Step 1: Install the required library
```
```
pip install pandas
```
```
Step 2: Create a Python script with the following code:

```python
import pandas as pd

# Constants
BUSINESS_ACTIVITY_EXCLUSIONS = [
    'alcohol', 'tobacco', 'gambling', 'adult entertainment', 'conventional finance'
]

NON_COMPLIANT_REVENUE_THRESHOLD = 0.05
DEBT_RATIO_THRESHOLD = 0.3
CASH_AND_SECURITIES_THRESHOLD = 0.3
ACCOUNTS_RECEIVABLE_THRESHOLD = 0.3

def is_shariah_compliant(business_activity, financial_data):
    if business_activity.lower() in BUSINESS_ACTIVITY_EXCLUSIONS:
        return False
    non_compliant_revenue_ratio = (
        financial_data['non_compliant_revenue'] / financial_data['total_revenue']
    )
    if non_compliant_revenue_ratio > NON_COMPLIANT_REVENUE_THRESHOLD:
        return False
    debt_ratio = financial_data['total_debt'] / financial_data['total_assets']
    if debt_ratio > DEBT_RATIO_THRESHOLD:
        return False
    cash_and_securities_ratio = (
        (financial_data['cash'] + financial_data['interest_bearing_securities'])
        / financial_data['total_assets']
    )
    if cash_and_securities_ratio > CASH_AND_SECURITIES_THRESHOLD:
        return False
    accounts_receivable_ratio = (
        financial_data['accounts_receivable'] / financial_data['total_assets']
    )
    if accounts_receivable_ratio > ACCOUNTS_RECEIVABLE_THRESHOLD:
        return False
    return True
# Example usage
business_activity = 'technology'
financial_data = {
    'total_revenue': 1000000,
    'non_compliant_revenue': 30000,
    'total_assets': 5000000,
    'total_debt': 800000,
    'cash': 300000,
    'interest_bearing_securities': 200000,
    'accounts_receivable': 1200000,
}
is_compliant = is_shariah_compliant(business_activity, financial_data)
print(f"Shariah compliance status: {is_compliant}")
```

Figure 1. A source code and algorithm for determining Shariah compliance criteria

5.   Conclusion

Robo advisory is an automated investment service that allows people to invest in portfolios that are built and managed by algorithms. In recent years, robo advisory has emerged as a popular choice for investors due to its lower fees, accessibility, and convenience. However, robo advisory has progressed beyond just investment management, and is now being used as an online learning platform that employs a Knowledge Management System with artificial intelligence capabilities.

The system is hosted on the internet and is available to both employees and customers. The system is intended to provide users with online education and decision-making assistance. The platform is user-friendly, with a simple and intuitive interface that allows users to navigate the system with ease.

Robo advisory is a type of automated investment service that has evolved into an online learning platform that employs a Knowledge Management System with artificial intelligence

capabilities. The system is user-friendly and open to both employees and customers. The system is the first expert system for Islamic finance, capable of providing expert advice on Shari'ah-compliant investment opportunities. The system can also automate financial procedures and employs cutting-edge artificial intelligence modelling to provide personalised investment recommendations. Finally, system users can research topics of interest and ask intelligent questions, making it a valuable resource for anyone seeking to improve their financial knowledge.

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