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## **ROLE OF HOUSEHOLDS' RELIGIOUS BELIEFS ON THE IRANIAN HOUSEHOLDS' UTILITY USING DYNAMIC STOCHASTIC GENERAL EQUILIBRIUM MODEL**

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### **ABSTRACT**

Since Iran is one of the *Muslim* countries and in a *Muslim* country, religious teachings and thoughts play an important role in the consumption and the behavior of economics of households, so, by separating household consumption expenditures into two parts, *halal* and non-*halal* consumption expenditures, this article examines *halal* household consumption expenditures and the effect and share of these expenditures on the utility of community members using the Dynamic Stochastic General Equilibrium (DSGE) model. The findings show that religion and religious thoughts in *Muslim*-majority societies play an important and influential role in determining the share of the household consumption bundle, and the utility of this group of households is highly dependent on the share of household consumption expenditures on *halal* goods. The results indicate that religious and pious people manifest a kind of religious-social behavior based on their religious thoughts, which plays an important role in determining the composition and consumption bundle of the household, which in turn helps to improve the country's economy and expand its institutional capacities in eliminating poverty and optimizing the market.

JEL classification: C53, D12, D50, Z10, Z12

Keywords: Religious beliefs, Households, *Halal* goods, Consumption expenditures

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## 1. INTRODUCTION

The important place of the *Qur'ān*, existing religious beliefs and tendencies, and *Muslim* traditions have always recommended followers of *Islām* to obtain permissible and legitimate material gains and have commanded them to consume *halal* and pursue pure livelihood. The frequent emphasis and advice of *Islām* on consumption according to their religious beliefs and teachings have led to the creation of an *Islāmic* economic system based on justice and the implementation of religious and *Islāmic* methods, which will undoubtedly contribute to economic growth and development as well as social welfare.

Relationship between ethics and economics can be traced back to the Renaissance, when the economy was considered a branch of ethics. Even in recent decades, some economists believed that a large number of economic issues and relationships have a profound connection with ethical issues; thus, the lack of a specific moral philosophy and theory can lead to serious contradictions in various areas of the economy and society.

In *Muslim* countries, religious teachings and thoughts play an important role in the lives of community members; as a result, there is a profound connection and mutual influence between religion, religious teachings, and the economy. The *Qur'ān*, which is the holy book of *Muslims*, refers to this trend in various verses. Sometimes detailing the social and economic behaviors, the *Qur'ān* considers it important that economic behaviors comply with religious teachings and adhere to religious orders.

From the *Islāmic* perspective the separation of ethics from economics is undoubtedly one of the most important factors in economic decline and collapse of countries' economies. For *Muslims*, economic behaviors are influenced by values and ethical beliefs in such a way that all microeconomic and macroeconomic plans and behaviors must be carried out with the aim of refining and purifying the soul. Besides, ethics affects economic health, and the desired economic behaviors in *Islām* also play a significant role in spiritual and ethical cleansing and vitality. Economic issues in *Islām* are based on an epistemological triangle whose three sides are made up of God, humans, and the world, where the type of relationship between the Creator and the world and humans on the one hand and the fundamentals of *Islāmic* anthropology on the other hand, determine how one views economy and behaviors around it. This distinguishes the *Islāmic* economic school from other economic schools. Therefore,

the economic school designs and offers solutions to economic problems based on accepted religious understandings and values.

*Islāmic* economics, which is a scientific discipline, seeks theoretical-experimental analysis of known economic realities and possible economic facilities in the light of *Islāmic* principles, which are free from colonization. This is done to discover the most efficient tools for enhancing production, its equitable distribution, and a consumption that is balanced and legally defined from the *Shari'ah* perspective, as a result reducing economic problems and improving human life. One of the important issues regarding the consumption of goods by *Muslims* is the consumption of *halal* goods and food, which has been repeatedly emphasized in the *Qur'ān*. *Halal* products refer to food whose consumption is permissible in *Islām*. “*Halal*” is also the collective name of trademarks (brands) that are marked on food products. This name is derived from the meaning of *halal* food mentioned in *Islām*, which was first introduced as a label for *halal* food and products. In recent years, this food trademark has globally been introduced by *Islāmic* countries as an independent identity and has been embraced even in non-*Islāmic* countries.

Since *Muslims* make up about 25% of the world population, the annual global market of *halal* goods and services provides a good prospect for trade even by non-*Muslim* countries. The *halal* food and goods industry are referred to in the religious texts of *Muslims* and the *Qur'ān* in several references and verses, and it has repeatedly been emphasized that forbidden (*haram*) food has a detrimental effect on the human body and soul. For example, we can refer to *Surah Al-An'am* verse 145, *Surah An-Nahl* verse 114 to 116, *Surah Al-Ma'idah* 3 to 5, *Surah Yunus* verse 59 and *Surah Al-Baqarah* verse 168.

This religious thought has led *Muslim* countries to define the word “*halal*” as a standard and create an independent identity for *Muslims* in *Islāmic* countries. Therefore, according to *Qur'ānic* teachings and the view of *Muslim* researchers, the introduction of religious thoughts and beliefs in economics has led to the creation of an *Islāmic* economy which has two parts: an economic doctrine and an economic system. *Islāmic* economics is defined as a series of fixed economic principles and policies inferred from the *Qur'ān* and *Sunnah* (traditions of the Prophet Muhammad *ṣal-Allāhu 'alayhi wa sallam*). The *Islāmic* economic system also involves adaptation of these principles to different local and temporal conditions and contains economic systems and solutions based on these principles but in accordance with the unique requirements of each period (Kamarudin and Kassim, 2022; Ariffin, Kassim, and Razak, 2015; Sufian, 2006).

*Muslims* are commanded to consume *halal* and live a pure livelihood. The frequent emphasis and advice of *Islām* on consumption according to their religious beliefs have led to the creation of an *Islāmic* economic system based on the implementation of religious and *Islāmic* methods. In *Muslim*-majority societies religion plays an important and influential role in determining the share of the household consumption bundle. Since the religious and pious people manifest a kind of religious-social behavior based on their beliefs, which play an important role in determining the composition and consumption bundle of the household; therefore, considering the large number of *Muslims* in the world, their role in consumption and economy is undeniable, and investigating this matter can be of great help to policymakers.

In general, by taking a look at religious teachings, *Qur'ān* verses, and the traditions of the *Islāmic* culture, this article looks at the economy and economic issues from a perspective of religion and religious thoughts in *Muslim* countries such as Iran. By separating household consumption expenditures into consumption expenditures of *halal* goods (goods whose consumption is permitted and recommended by custom and religion of the individuals) and non-*halal*, this study examines the relationship between religious thoughts and their role in the economy of Iran and households' utility and also examines the impact of household and economic behaviors when the share of these goods in household consumption expenditures is changed using the DSGE or dynamic stochastic general equilibrium model.

## 2. LITERATURE REVIEW

Past studies point to the close relationship between religious teachings and economics in *Islāmic* societies. Some *Muslim* thinkers define *Islāmic* economics as the study, extraction, and application of *Islāmic* propositions and principles in economics. Another group considers *Islāmic* economics as research on achieving *Islāmic* goals in economics. In some other studies, *Islāmic* economics is referred to as the study of economic problems and solutions in *Islām*. Some other thinkers have described *Islāmic* economics as the study of human behavior (*Muslim* humans) in choosing and making decisions. Still, others offer a composite definition for *Islāmic* economics, in which *Islāmic* economics consists of investigating problems, goals, behaviors, and measures of *Islāmic* economics (Furqani, 2018).

*Islāmic* economics is a path that *Islām* seeks to follow in the economic aspect to achieve justice. It is a body of knowledge and the application of criteria and rules of *Sharī'ah* (divine *Islāmic* laws) that prevent injustice in the acquisition and access to material resources. Its goal is to ensure the satisfaction of individuals and enable them to fulfill their commitments to both God and society. In essence, *Islāmic* economics is a path prescribed by *Islām* for individual and social behavior in the economic domain, and examining *Islāmic* laws in this context (Hasanuzzaman, 1984).

*Islāmic* economics comprises the school, system, and science of the *Islāmic* economy. The economic doctrine of *Islām* consists of general rules for regulating economic relations in the three areas of production, distribution, and consumption, aimed at alleviating difficulties and achieving economic objectives (Hasan, 2013).

The *Islāmic* economy is an economy that governs a society based on religious teachings, and its institutions operate according to *Islāmic* principles. Members of this society also believe in *Islāmic* values and follow the *Islāmic* path in their daily lives (Attia, 2008).

It refers to a system that organizes the distribution of wealth and income among all members of society, providing opportunities for earning income and benefiting from it. The laws and guidelines are shaped based on the *Islāmic* economic school, striving to present a suitable model for improving social life with the help of *Islāmic* teachings (Akram Khan, 1984).

*Islāmic* economics is a science that studies how to meet human needs, individually and collectively, by utilizing resources according to *Islāmic* principles and frameworks. *Islāmic* economics is an attempt to formulate a human and social economy that rejects the prevalence of individualism in classical economics (Haneef and Furqani, 2011).

It is a science that seeks human prosperity by allocating scarce resources in a manner consistent with the purposes of *Sharī'ah*, while not imposing any unnecessary restrictions on individual freedom, not causing persistent macroeconomic and ecological imbalances, nor weakening the family and moral spirit of society. *Islāmic* economics is a science that studies the best possible way to use the available economic resources as divine blessings to produce the maximum possible amount of *halal* goods and services needed by society both now and in the future, and aims at distributing these products fairly based on the *Sharī'ah* framework and principles (Zaman, 2009).

*Islāmic* economics is a composite social science that studies the problems existing in production, distribution, and consumption

within the combined system of exchange and transfer over time and its social and ethical consequences from an *Islāmic* rationality perspective. *Islāmic* economics is a social science that studies the economic problems of people who are affected by *Islāmic* values (Azid, 2010).

Hence *Islāmic* economics is an approach to interpreting and solving human economic problems based on values, norms, laws, and institutions derived and extracted from *Islāmic* epistemic sources. *Islāmic* economics is the *Muslim* thinkers' response to the economic challenges of their time. In this effort, they use the *Qur'ān*, *Sunnah*, intellect, and experience (Haneef, 2013).

*Islāmic* economics is a set of economic principles and foundations presented by *Islām* in the texts of the *Qur'ān* and *Sunnah*, as well as economic methods, plans, and solutions adopted by government authorities based on these principles. *Islāmic* economics is the study of the economic behavior of real *Muslims* in a society which is based on the *Qur'ān*, *Sunnah*, consensus (*ijma*), and analogy (*qiyas*). *Islāmic* economics is the study of typical *Muslim* behavior in an *Islāmic* society (Zarqa, 2003).

Besides that, *Islāmic* economics is the study of the economic behavior of men and women as individual economic actors, the behavior of societies, and that of collective phenomena. The study of problems, goals, behaviors, and *Islāmic* economic measures includes economics and economic rules as well as analytical and executive economics (Tavakoli, 2020).

Most *Muslim* economists who analyze the behavior of *Muslim* consumers have examined the factors affecting budget allocation and consumption of *Muslim* individuals based on *Islāmic* teachings. Since adhering to God's rights and resource allocation from an *Islāmic* perspective is highly important according to religious beliefs, it has been studied by *Muslim* economists, including studies by Hasan (2002), Hossain (2014), Omar Mohammed (2011), and Yasser (2016).

One category of studies based on conventional economic literature within the framework of *Islāmic* economic models considers the religious constraints governing the behavior of *Muslim* individuals. Among these studies conducted by *Muslim* economists, we can mention the following:

Kahf (1980) addresses the definition of rationality from the perspective of *Muslim* consumers, their different time horizon compared to others, and consumer behavior from an *Islāmic* perspective. His study suggests that *Muslim* consumers have a longer time horizon compared to others, which can be attributed to their belief

in the afterlife. A *Muslim* individual chooses afterlife benefits in case of conflict between worldly and afterlife interests.

Studies by Fahim Khan (1984) and Hasan (2005) introduce an aggregate consumption model in *Islāmic* economics by distinguishing macroeconomic consumption function groups within an *Islāmic* framework. They design consumer behavior based on needs and state that belief in the afterlife causes consumers to allocate a portion of their assets to religious matters. Thus, the afterlife enters their objective function, and assets are allocated accordingly. *Muslim* consumers balance their goals between this world and the afterlife when considering their expenses.

Coşgel and Minkler (2004) and Bulbulia (2004) examine the effect of religious identity on consumption and state that religious individuals adjust their behavior within the framework of their interests in the supernatural world. Belief in the supernatural world and the afterlife leads to behaviors termed as religious behaviors.

Studies by Iqbal (1985) and Thornton and Helms (2013) define utility as the satisfaction derived from any action that pleases God. Therefore, *Muslim* consumers, followers of religions with salvation criteria, and households with religious beliefs draw a different personal consumption indifference curve by applying restrictions related to *Islāmic* laws, hence limiting the choices of *Muslim* consumers.

Dadgar and Ezzati (2002), Hadavinia (2019), and Dadgar and Bagheri Todeshki (2001) state that just as humans save part of their current income in hopes of increasing future utility, they also spend another part of their income, believing in life after death, in hopes of gaining greater utility in that period. These studies also declare that in *Islāmic* societies where most individuals believe in *Islāmic* principles and values, and *Islāmic* law is implemented, most individuals act rationally in terms of behavior. Therefore, for *Muslims* whose goal is to achieve maximum worldly and afterlife pleasures, consistent behavior is that which aligns with religious instructions. On this basis, Muslim consumers, like any other consumer, seek to maximize their utility, but since the ultimate goal of every *Muslim* is to gain God's satisfaction, they consider themselves obliged to observe *Islāmic* commandments. To this end, in addition to maximizing worldly pleasures, they have a complete view of afterlife pleasures and prioritize religious expenses based on religious teachings in society. Therefore, utility is divided into three main parts: first, material utility derived from consuming material goods; second, spiritual utility from

doing things for God's sake; and third, utility from the assurance and peace of mind resulting from the second type of actions.

In comparing *Islāmic* and non-*Islāmic* economic studies, it is clear that serious conflict exists between Western culture and *Islāmic* culture in terms of lifestyle. The definition of a good life in *Islāmic* culture is based on afterlife-orientation and the role of worldly life as preparation for the afterlife, which is the main goal and real life stemming from faith. This is in direct contrast to Western culture, which is based on hedonism and aims at worldly life enjoyment. On this basis, it can be said that the *Islāmic* perspective focuses attention on certain behaviors and economic consumption and prioritizes them, while these same aspects are either not considered or not prioritized in the Western perspective.

### 3. MODEL AND METHODOLOGY

Religion can be an influential and important variable in the economics of each country. The role of religious tendency and religious thoughts on households and their community and economic performance is very vital. Hence separating household consumption expenditures into two parts -- *halal* and non-*halal* consumption expenditures -- can show that religious thoughts influence *Muslim* societies and can affect the country's economy. This paper applies economic studies to rebuild a model for studying the relationships between religion and economics. This model investigates *halal* goods consumption expenditures of households, sketches and describes the variables and then examines households' utility status and economic performance by showing how changing the share of *halal* consumption expenditures in Iranian societies affects the economy in general.

This paper considers an open economy like Iran's economy with a representative household with religious beliefs and affiliations, a firm and a government using the DSGE (dynamic stochastic general equilibrium) framework. The model is an extension of an economy for economic performance analysis. Also, the basic model is an economy DSGE or model similar to models proposed by several economic studies that assume a model with DSGE framework to examine an economy's response to unanticipated and permanent terms of trade shock such as Christiano, Eichenbaum, and Evans (2005), Christiano, Trabandt, and Walentin (2011), Tavakoli (2020), Izadi (2023a; 2023b; 2023c; 2023d; 2022a; 2022b; 2022c; 2021), Izadi and Shirafkan Lamsoo (2022), Nasrindoost et al. (2021), Ghaseminasab et al. (2021), Zare et al. (2020), Asghari et al. (2019), Manzoor and

Taghipour (2016), Taghipour and Manzoor (2016), Javan-Noughabi et al. (2017), and Tavakolian and Komijani (2012). For this purpose, it is considered this economy is populated by a large number of identical households (the utility is in the logarithmic form) that receive income from providing labor and capital and choose a path of consumption expenditures and capital investment to maximize their utility given by:

- (1)  $E_0 \sum_{t=0}^{\infty} \beta^t U(TCC_t, HH_t)$
- (2)  $U_t = U_t^O - U_t^H$
- (3)  $U_t^H = \ln(TCC_t^H) + \chi \ln(1 - HH_t)$
- (4)  $U_t^O = \ln(TCC_t^O) + \chi \ln(1 - HH_t)$
- (5)  $TCC_t + K_{t+1} = (1 - \tau_H)W_t HH_t + (1 + R_t(1 - \tau_K) - \delta)K_t$
- (6)  $(1 - \tau_H)W_t = \chi \left( \frac{TCC_t}{1 - HH_t} \right)$
- (7)  $\frac{1}{TCC_t} = \beta E \left[ (1 + (1 - \tau_K)R_t - \delta) \frac{1}{TCC_{t+1}} \right]$
- (8)  $TCC_t = \omega TCC_t^H + (1 - \omega)TCC_t^O$

Wherein is  $U_t$  utility function of households,  $TCC_t$  is total consumption expenditures of goods,  $TCC_t^H$  is consumption expenditures of non-*Halal*,  $TCC_t^O$  is consumption expenditures of *Halal* goods,  $\omega$  is Share of consumption expenditures of non-*Halal* (*Haram*) goods in total consumption expenditures and  $HH_t$  is labor of households.

- (8)  $K_{t+1} = I_t + (1 - \delta)K_t$
- (10)  $Y_t = F(HH_t, K_t) = (e^{a_t} HH_t)^\alpha K_t^{1-\alpha}$
- (11)  $R_t = (1 - \alpha)(e^{a_t})^\alpha \left( \frac{HH_t}{K_t} \right)^\alpha$
- (12)  $W_t = \alpha(e^{a_t})^\alpha \left( \frac{HH_t}{K_t} \right)^{\alpha-1}$

Where  $R_t$  explains the interest rate,  $Y_t$  denotes domestic output,  $I_t$  denotes gross investment, and  $K_t$  denotes physical capital,  $\delta$  denotes the depreciation rate of physical capital.

Technology shocks are sudden technological changes that significantly affect economic, social, political or other outcomes. In economics, the term technology shock usually refers to events in a macroeconomic model, that change the production function. Usually, this is modelled with an aggregate production function with a scaling factor. Firms use capital and labor to produce goods for consumption, while Government encourages investment and spends on

development. The production technology is a simple Cobb-Douglas function with a sectorial stationary productivity shock and a non-stationary, labor-augmenting technological shock. The growth rate of productivity implies that output per capita and other cointegrated variables grow at the same annual rate. Also, in this model, the productivity shock is the labor augmented technical progress with a following an AR (1) process and Government expenditure shock is the Government spending with a following an AR (1) process are given by:

$$(13) \quad a_t = \rho_a a_{t-1} + \varepsilon_{a,t}$$

$$(14) \quad g_t = \rho_g g_{t-1} + \varepsilon_{g,t}$$

The government sector will collect the revenue through taxes provided by households and firms to the government and then this resource by the government will be provided as collective services and welfare payments to the community. The government has to finance exogenously given consumption. It is assumed that the government operates with a balanced budget and imposes taxes on labor and capital income. The budget constraint is given by:

$$(15) \quad e^{g_t} G_t = \tau_H W_t H H_t + \tau_K R_t K_t$$

For simplicity, it is assumed that the model of this research is a three-sector model based on (1) households, (2) firms, and (3) government. The government sector consists of the economic activities of local, state and federal governments. Finally, the gross domestic production (Market Clearing) and welfare function is defined as:

$$(16) \quad Y_t = T C C_t + I_t + e^{g_t} G_t$$

#### 4. DESIGN, SIMULATION AND DISCUSSION

This paper uses economic studies to build a model for studying the effects of Households' Religious Beliefs on the Iranian Households' Utility. The research considers an open economy with a representative household, a firm, and a government using the DSGE or dynamic stochastic general equilibrium framework. This economy is populated by several numbers of households that receive income from providing labor and capital and choose a path of consumption and capital investment to maximize their utility. We expand a DSGE model for

an open economy and calibrate it on Iranian area data and parameters adapted from the studies done on Iran's economy.

Considering that religion influences economic performance and with religion and its effects viewed as a variable, based on the economics literature of models for an economy with religious beliefs, the research model used the parameter values listed in Table 1 to solve and simulate the pattern. In this paper, we sketch previous studies with a focus on religious beliefs by the parameters in Table 1.

TABLE 1  
Calibration Parameters

Parameters	Description	Value	Source	Source
$\delta$	Depreciation rate	0.0139	Zare Shahneh et al. (2020)	Izadi (2023a)
$\chi$	Risk aversion	2	Tavakolian and Komijani (2012)	Izadi and Shirafkan Lamsou (2022)
$\alpha$	Capital share	0.44	Manzoor and Taghipour (2016)	Izadi (2018)
$\beta$	Discount factor	0.9952	Asghari et al. (2019)	Izadi (2023d)
$\tau^k$	Tax on Capital	0.356	Ghaseminasab et al. (2021)	Izadi (2022b)
$\tau^h$	Tax on Labor	0.047	Nasrindoost et al. (2021)	Izadi (2022b)
$\rho_a$	Technology Shock Persistence	0.599	Taghipour and Manzoor (2016)	Izadi (2023b)
$\varepsilon_{a,t}$	Technology Shock Standard Deviation	0.016	Taghipour and Manzoor (2016)	Izadi (2022a)
$\rho_g$	Government Spending Shock Persistence	0.929	Javan et al. (2018)	Izadi (2021)
$\varepsilon_{g,t}$	Government Spending Shock Standard Deviation	0.075	Javan et al. (2018)	Izadi (2022c)
$G/y$	Government Spending	0.125	Tavakolian (2021)	Izadi (2023c)

Table 2 defines the effects of changes in the share of consumption expenditures of non-*Halal* goods  $TCC_t^H$  with different values and then reports the quantity of the mean and standard deviation of some variables. According to Table 2, the increase in the share of households' non-*Halal* consumption expenditures in total consumption expenditures ( $\omega$ ), has increased the mean amount and standard deviation of the share of consumption expenditures on non-*Halal* goods, and at the same time, the households' utility function  $U_t$  has decreased. Because of the religious beliefs of the community, the utility of society has decreased because the consumption of non-*Halal* goods is associated with lower utility and displeasure for the households.

According to the teachings of *Islām*, there is a fundamental difference in the rational behavior pattern of *Muslims* who believe in a system of rewards and punishments in the afterlife compared to those who frame their behavior solely within the material world. This indicates that alongside seeking their own satisfaction, *Muslims* also consider God's satisfaction. Therefore, they prioritize maximizing God's satisfaction over their own and prefer to benefit from both material pleasures and spiritual rewards. In other words, in most *Muslim* societies, there is a preference for the pleasures of the afterlife and spiritual rewards over worldly and material pleasures.

Similarly, as the share of households' non-*Halal* consumption expenditures in total consumption expenditures decreased, the average and standard deviation of the share of consumption expenditures of *Halal* goods  $TCC_t^O$  has increased and, at the same time, households' utility  $U_t$  has increased. For this reason, the utility of society has increased, as the consumption of *Halal* goods and services creates higher satisfaction for households, and households would rather consume *Halal* goods and services.

Therefore, the results show that in a society with religious thoughts, the role of *halal* goods in the bundle of consumption goods becomes important and households consume goods based on their religious beliefs. So, in *Muslim* societies, more utility is obtained from the consumption of *halal* and religious goods.

According to verses and narrations from reliable religious sources, the behavior of a *Muslim* individual is based on a kind of spiritual investment that can have positive consequences in this world and the hereafter. Therefore, *Muslim* individuals and households aim at maximizing divine rewards in order to please God.

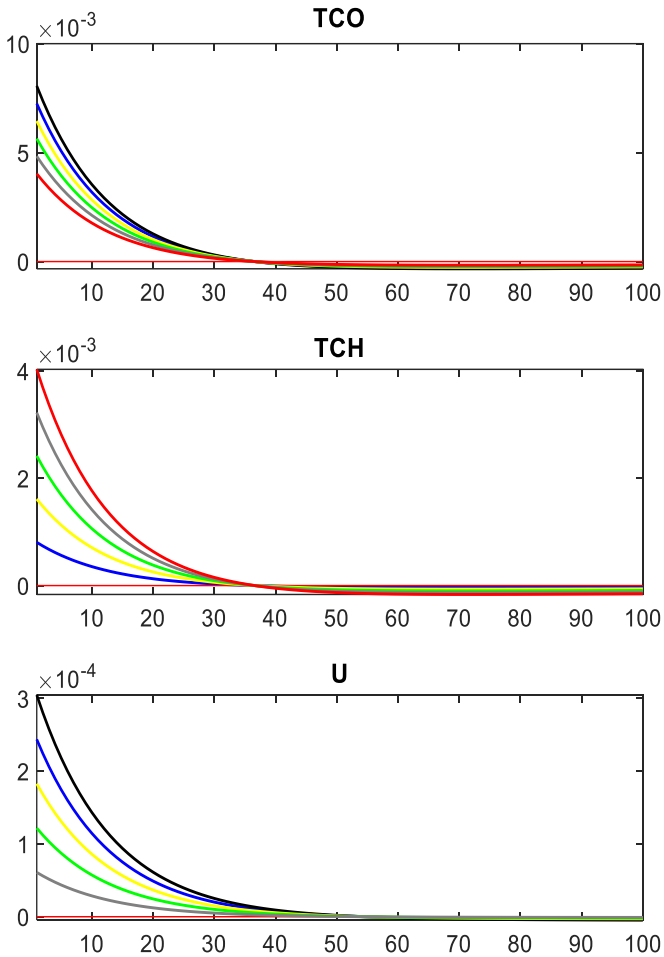
TABLE 2  
Moments of Simulated Variables Caused By Changes in The Share  
of Non-*Halal* Consumption Expenditures

Variable		$U_t$	$TCC_t^H$	$TCC_t^O$
Mean	$\omega = 0.0$	0.0010	0.0000	1.0317
	$\omega = 0.1$	0.0008	0.1031	0.9286
	$\omega = 0.2$	0.0006	0.2063	0.8254
	$\omega = 0.3$	0.0004	0.3095	0.7222
	$\omega = 0.4$	0.0002	0.4127	0.6190
	$\omega = 0.5$	-0.0000	0.5158	0.5158
	$\omega = 0.6$	-0.0002	0.6190	0.4127
	$\omega = 0.7$	-0.0004	0.7222	0.3095
	$\omega = 0.8$	-0.0006	0.8254	0.2063
	$\omega = 0.9$	-0.0008	0.9286	0.1031
	$\omega = 1$	-0.0010	1.0317	0.0000
Std. Dev.	$\omega = 0.0$	0.0049	0.0000	0.0296
	$\omega = 0.1$	0.0039	0.0029	0.0266
	$\omega = 0.2$	0.0029	0.0059	0.0236
	$\omega = 0.3$	0.0019	0.0088	0.0207
	$\omega = 0.4$	0.0009	0.0118	0.0177
	$\omega = 0.5$	0.0000	0.0148	0.0148
	$\omega = 0.6$	0.0009	0.0177	0.0118
	$\omega = 0.7$	0.0019	0.0207	0.0088
	$\omega = 0.8$	0.0029	0.0236	0.0059
	$\omega = 0.9$	0.0039	0.0266	0.0029
	$\omega = 1$	0.0049	0.0296	0.0000

Source: Research findings

Figure 1 shows the shock-impact function of government expenditures in the presence of changes in the parameter of the share of households' non-*Halal* spending ( $\omega = 0$  to  $\omega = 0.5$ ) on the utility function of households' consumption. The results of this function demonstrate that the lower the value of this parameter and the closer it is to zero, that means the more share of household's *Halal* consumption expenditures in total consumption expenditures, the weaker the impact of this shock on the  $TCC_t^H$  function and the stronger the impact on the  $TCC_t^O$  function.

FIGURE 1  
Impulse Response to a Unit Government Spending Shock in Model



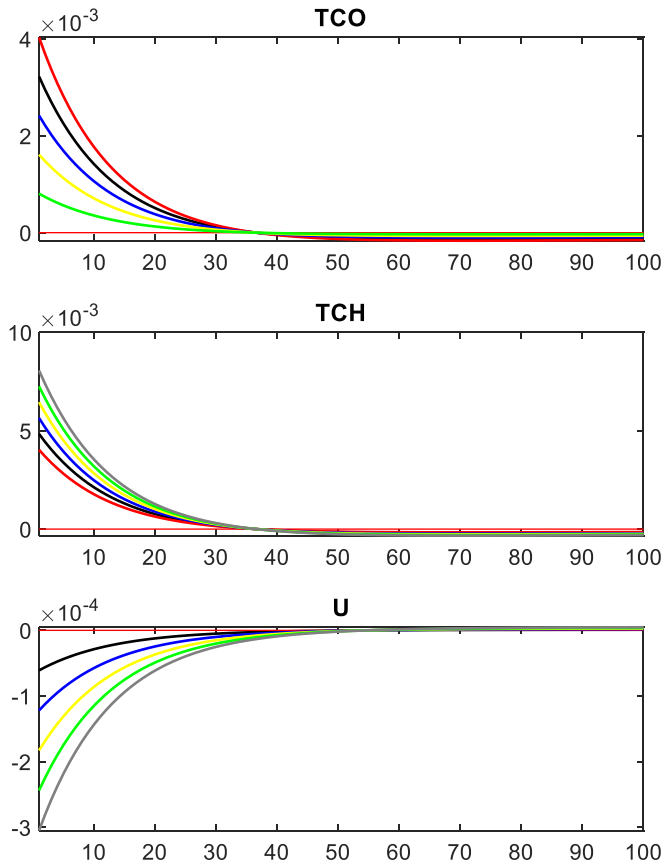
Note. Black Line:  $\omega = 0.0$ , Blue Line:  $\omega = 0.1$ , Yellow Line:  $\omega = 0.2$ , Green Line:  $\omega = 0.3$ , Gray Line:  $\omega = 0.4$  and Red Line:  $\omega = 0.5$ .

Source: Research findings

The higher the value of this parameter, the stronger the effect of this shock on the  $TCC_t^H$  function and the weaker the effect of this shock on the  $TCC_t^O$  function. Thus, from these graphs, we can see that the shock effect of government spending on the households' utility

function  $U_t$  varies following the change in the share of consumption expenditures of non-*Halal* goods and the consequent change in the composition of the bundle of goods, which is a composition of non-*Halal* goods and *Halal* goods. Depending on which consumption expenditures bundle the households have selected, the shock has a larger effect on the utility of consuming these commodities.

FIGURE 2  
Impulse Response to a Unit Government Spending Shock in Model



Note. Red Line:  $\omega = 0.5$ , Black Line:  $\omega = 0.6$ , Blue Line:  $\omega = 0.7$ , Yellow Line:  $\omega = 0.8$ , Green Line:  $\omega = 0.9$  and Gray Line:  $\omega = 1$ .

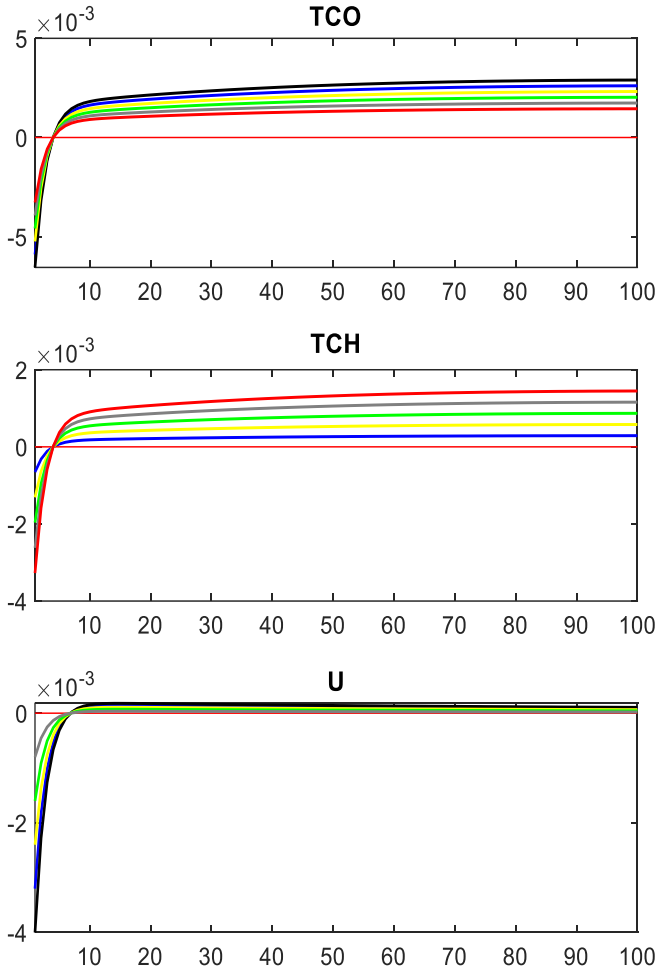
Source: Research findings

Figure 2 presents the shock-impact function of government expenditures in the presence of changes in the parameter of the share of household s' non-*Halal* spending ( $\omega = 0.5$  to  $\omega = 1$ ) on the utility function of households' consumption. The results of this function present that the higher the value of this parameter and the closer it is to one, the stronger the effect of this shock on the consumption variable  $TCC_t^H$  and the weaker the effect on the consumption variable  $TCC_t^O$ . The higher the value of this parameter, the stronger the trace of this shock on the consumption variable  $TCC_t^H$  and the weaker the trace of this shock on the consumption variable  $TCC_t^O$ . Thus, from these graphs, we can see that the shock trace of government expenditures on the utility of households' consumption variable  $U_t$  varies due to the change in the share of *Halal* and non-*Halal* consumption goods and the resulting change in the combination of the bundle of goods expenditures, which is a combination of non-*Halal* goods and *Halal* consumption goods, which is due to the choice of the combination of the households' bundle of goods.

Therefore, in general, graph (1) and graph (2) demonstrate that in a society with religious ideas, in *Muslim* societies, the share of *halal* goods in the bundle of consumption commodities causes a higher utility and a higher satisfaction for the households.

Figure 3 presents the shock function of the response to the technology shock in the presence of changes in the parameter of the share of households' non-*Halal* spending ( $\omega = 0$  to  $\omega = 0.5$ ) on the utility function of households' consumption. The results of this function demonstrate that the lower the value of this parameter and the closer it is to zero, the stronger the impact of this shock on the  $TCC_t^O$  function and the weaker the impact of this shock on the  $TCC_t^H$  function. The higher the value of this parameter, the stronger the effect of this shock on the  $TCC_t^H$  function and the weaker the impact of this shock on the  $TCC_t^O$  function. Thus, from these graphs, we can see that the effect of the technology shock on the households' utility function  $U_t$  will be distinct due to the change in the share of consumption spending and the resulting change in the composition of the bundle of commodities, which is a combination of non-*Halal* goods and *Halal* consumption goods.

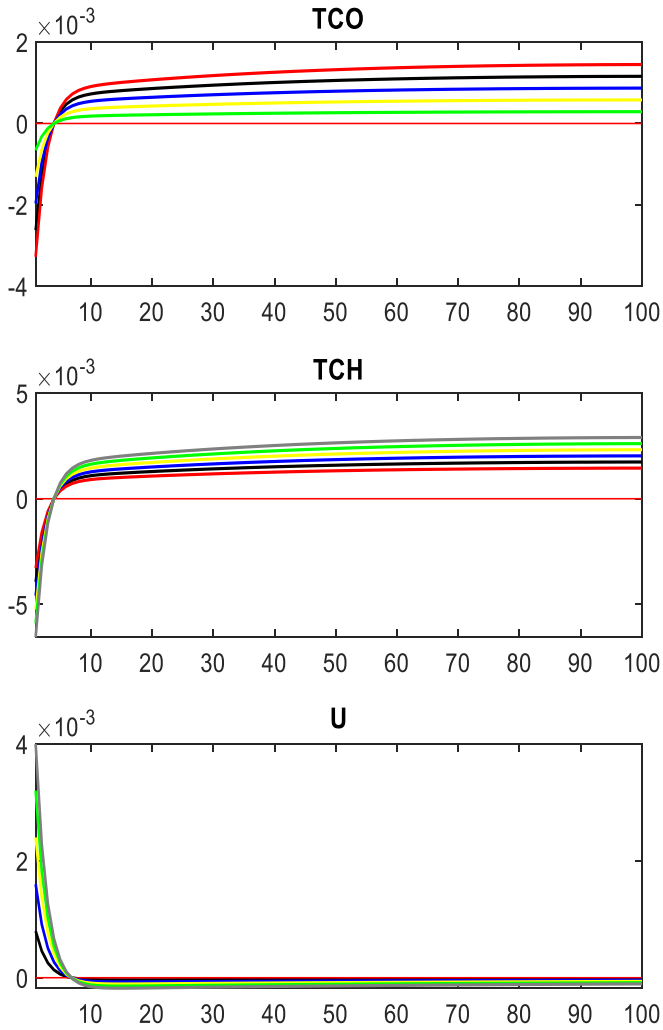
**FIGURE 3**  
**Impulse Response to a Unit Technology Shock in Model**



Note. Line:  $\omega=0.0$ , Blue Line:  $\omega=0.1$ , Yellow Line:  $\omega=0.2$ , Green Line:  $\omega=0.3$ , Gray Line:  $\omega=0.4$  and Red Line:  $\omega=0.5$ .

Source: research findings

**FIGURE 4**  
**Impulse Response to a Unit Technology Shock in Model**



Note. Red Line:  $\omega=0.5$ , Black Line:  $\omega=0.6$ , Blue Line:  $\omega=0.7$ , Yellow Line:  $\omega=0.8$ , Green Line:  $\omega=0.9$  and Gray Line:  $\omega=1$ .

Source: research findings

Figure 4 presents the shock function of the response to the technology shock under changes in the parameter of the share of households' non-*Halal* spending ( $\omega = 0.5$  to  $\omega = 1$ ) in the households' consumption and utility variables. The results of this function demonstrate that the higher the value of this parameter and the closer it is to one, the stronger the effect of this shock on the consumption variable  $TCC_t^H$  and the weaker the effect on the consumption variable  $TCC_t^O$ . The higher the value of this parameter, the stronger the impact of this shock on the  $TCC_t^H$  consumption variable and the weaker the trace of this shock on the  $TCC_t^O$  consumption variable. Thus, from these graphs, we can see that the trace of the technology shock on the household's consumption variables will be distinct because of the change in the share of consumption goods spending and the resulting change in the mixture of the shopping bundle, which is a combination of non-*Halal* goods and *Halal* consumption commodities, based on the choice of the combination of the households' shopping bundle.

Generally, Figure 3 and Figure 4 display the shock function of the response to the technology shock in the presence of changes in the household's consumption expenditures and the share parameter  $\omega$  on the households' utility function  $U_t$ . The consequences of this function show that the impact of this shock on the household's utility function is negative and reduces households' utility when the lower the value of this parameter is chosen and the closer it is to zero.

The higher the value of this parameter, the more positive the effect of this shock on the utility function of the household  $U_t$  and the higher the welfare of the household. Because the share of non-*halal* goods in the goods package of households has increased, the technology shock has increased the production of non-*halal* commodities and services, and as a result, the utility of other households in society decreases with this shock. Accordingly, the lower the value of this parameter, the lower the effect of this shock on the utility function of the household  $U_t$  and the welfare of the household. Because the share of *halal* goods in the bundle of household goods has increased, the technology shock has increased the production of *halal* commodities and services, and as a result, the utility of households increases with this shock.

Therefore, in general, it can be said that one of the factors influencing human habits and behaviors is religion and religious norms. *Muslim* economists have made great efforts to examine the macro consumption pattern with an *Islāmic* approach. In this study, since the majority of people in Iran are *Muslims*, based on the principle

of maximizing spiritual and afterlife benefits, and considering the theoretical foundations discussed in *Islāmic* economics regarding consumption, the consumption function changes based on *Islāmic* government laws and *Muslim* population, and the consumption of forbidden goods will lead to a decrease in society's utility.

## 5. CONCLUSIONS

In *Muslim* societies, paying attention to the economic issues in the basic principles of *Islām* will lead to a strong community that enjoys spiritual and psychological stability as well as progress. The existing *Qur'ān* verses and the traditions on this subject provide a good verbal and behavioral model for individuals, in a way that forms a society moving toward perfection, which is the ultimate goal of religious and *Islāmic* teachings.

For *Muslim* consumers, creating a balance between this world and the afterlife is required. *Muslim* individuals incorporate their level of piety as a factor in their consumption function and seek maximum salvation. Here, salvation is a function of a set of religious, political, cultural, psychological, social, and legal factors in the way of God, and *Muslim* consumers maximize their utility through consumption in this world and gaining rewards in the afterlife by observing *Islāmic* rules.

The current study examines religion's outlook as an influential variable on economic and social outcomes and also studies the role of religious tendency and religious thoughts on household and community economic performance. In doing so, by separating household consumption expenditures into two parts of *halal* and non-*halal* consumption expenditures, it can be said that religious thoughts, in generally *Muslim* societies, play an important and influential role in household utility as well as in determining the consumption bundle and its composition. On the other hand, religion also impacts the national economy by influencing some personal characteristics of its individuals, which in turn can increase people's productivity in economic areas. Work conscience, honesty, ethics, and other human values are also the results of religious thoughts that can affect the economy and saving. Religion, on the one hand, increases public participation in performing religious acts and rituals, while religious beliefs on the other hand influence economic performance. The latter is done through influencing people's characteristics such as work ethic, honesty, and moderation in consumption.

Implementing the *Islāmic* economic style in variables such as consumption and savings in different countries, and considering the effect of religion and attitudes on economic behaviors, are factors that can create fundamental changes in the lifestyle and behaviors of households. Therefore, education and even teaching the *Islāmic* lifestyle and its components in schools, universities, and families can lead to reform of household consumption patterns and effectively influence household savings, as *Islām* brings numerous laws for improving the economy, justice, and equality. Thus, the spread of practical *Islāmic* ethics and religious laws can reduce economic problems of society and help the government in reducing poverty rates. Therefore, individual beliefs, values, attitudes, and religious tendencies all play an important role in shaping human identity and lifestyle.

On the other hand, the multi-billion-dollar global market of *halal* products is a tool to create a common *Islāmic* market and to form solidarity between *Islāmic* countries and members of the Organization of Islamic Cooperation. Through developing international *halal* food standards by experts from *Islāmic* countries, as one of their important actions, this market encourages companies and merchants in *Islāmic* countries to invest more in *halal* industries worldwide. Expanding global demand for implementing *halal* global standards and trading *halal* products in various areas has led to the creation of *halal* food markets, *halal* medicine, *halal* sanitary products, *halal* cosmetics, *halal* tourism, *halal* financial services such as banking, stock exchanges, Sukuk, insurance, finance, *halal* transit, *halal* clothing and *halal* ancillary services such as media, sports and recreation, business and so on, hence promoting growth and improved economic performance.

One of the limitations of this study is the lack of studies and literature on the separation of household consumption expenses into *halal* and non-*halal* consumption expenditure. Future studies may focus on *halal* and non-*halal* consumption expenditures in several countries and survey the share of *Muslim* countries in world economics for comparison.

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## REFERENCES

- Akram Khan, M. "Islamic Economics: Nature and Need." *Journal of Research in Islamic Economics* 1, no. 2 (1984): 55–61.
- Ariffin, N.M, S.H. Kassim, and D.A. Razak. "Exploring Application of Equity-Based Financing Through Mushārah Mutanaqīshah in Islamic Banks in Malaysia: Perspective from The Industry Players." *International Journal of Economics, Management and Accounting* 23, no. 2 (2015): 241-61.
- Asghari, T., M. Abdollahi Arani, and A. Monsef. "Investigating the Interaction Effects of Inflation, Production and Exchange Rates on the Iranian Economy: A Model for Simultaneous Equations." *New Applied Studies in Management, Economics & Accounting* 2, no. 2 (2019): 21-33.
- Attia, G. *Towards Realization of the Higher Intents of the Islamic Law: Maqasid al-Shari'ah, a Functional Approach* (First Edition). International Institute of Islamic Thought (IIIT), 2008.
- Azid, T. "Anthology of Islamic economics: Review of Some Basic Issues." *Review of Islamic Economics* 13, no. 2 (2010): 165-94.
- Bulbulia, J. "Religious Costs as Adaptations that Signal Altruistic Intention." *Evolution and Cognition* 10, no. 1 (2004): 19-42.
- Christiano, L.J, M. Eichenbaum, and C.L. Evans. "Nominal Rigidities and the Dynamic Effects of a Shock to Monetary Policy." *Journal of Political Economy* 113, no. 1 (2005): 1-45.
- \_\_\_\_\_, M. Trabandt, and K. Walentin. "Introducing Financial Frictions and Unemployment into a Small Open Economy Model." *Journal of Economic Dynamics and Control* no. 35 (2011): 1999-2041.
- Coşgel, M.M. and L. Minkler. "Religious Identity and Consumption." *Review of Social Economy* 62, no. 3 (2004): 339–50.
- Dadgar, Y. and M. Bagheri Todeshki. "A Glance at the Consumption Level in Islam." *The Journal of Economic Studies and Policies* no. 1 (2001): 115-36.
- \_\_\_\_\_. and M. Ezzati. "Examining the Relationship between Religion and Consumer Behaviour in other (Non - Islamic) Faiths." *The Journal of Economic Studies and Policies* no. 2 (2002): 71-100.

- Fahim Khan, M. "Macro Consumption Function in an Islamic Framework." *Journal of King Abdulaziz University: Islamic Economics* 1, no. 2 (1984): 3-25.
- Furqani, H. "Islamic Economics as A Discipline: Classification of Definition and Clarification of Subject Matter." *Turkish Journal of Islamic Economics* 5, no. 2 (2018): 69-93.
- Ghaseminasab S, M. Maddah, and A. Arabmazar. "The Analysis of the Effects of Labor income and Capital Gain Tax Rates on Macroeconomic Variables: Based on Overlapping Generation Models (DSGE) Approach." *Journal of Economic Research and Policies* 29, no. 99 (2021): 107-51.
- Haneef, M.A. and H. Furqani. "Methodology of Islamic Economics: Overview of Present State and Future Direction." *International Journal of Economics, Management & Accounting* 19, no. 1 (2011): 23-47.
- \_\_\_\_\_. "Islam, The Islamic Worldview and Islamic Economics." *International Journal of Economics, Management and Accounting* 5, no. 1 (2013): 39-65.
- Hadavinia, A. "The Economic Man's Model from the Viewpoint of Islam." *Islamic Economics* 19, no. 74 (2019): 35-63.
- Hasan, Z. "Islamization of Knowledge in Economics: Issues and Agenda." *International Journal of Economics, Management and Accounting* 6, no. 2 (2013): 1-40.
- \_\_\_\_\_. "Maximization Postulates and Their Efficacy for Islamic Economics." *American Journal of Islam and Society* 19, no. 1 (2002): 95-118.
- \_\_\_\_\_. "Treatment of Consumption in Islamic Economics: An Appraisal." *Islamic Economics* 2, no. 18 (2005): 29-46.
- Hasanuzzaman, S.M. "Definition of Islamic Economics." *Journal of Research in Islamic Economics* 1, no. 2 (1984): 49-60.
- Hossain, B. "Application of Islamic Consumer Theory: An Empirical Analysis in the Context of Bangladesh." *Global Review of Islamic Economics and Business* 2, no. 1 (2014): 69-83.
- Iqbal, M.Z. "Moderation and Aggregate Consumption in an Islamic Economy." *Journal of King Abdulaziz University: Islamic Economics* 3, no. 1 (1985): 45-61.
- Izadi, H.R. "The Effect of Economic Fluctuations on Health Care Expenditures of Iranian Households Using the DSGE Model." *DLSU Business & Economics Review* 33, no. 1 (2023a): 88-96.

- \_\_\_\_\_. “Measuring the Effects of Risk Aversion Change on Households’ Performance Using Endogenous Discount Factor Model.” *Economic Alternatives* 29, no. 2 (2023b): 374-83.
- \_\_\_\_\_. “The Behavior of Households Using the Dynamic Stochastic General Equilibrium Model: Alternative Models.” *Jurnal Ekonomi Malaysia* 57, no. 1 (2023c):1-8.
- \_\_\_\_\_. “The Role of Internalization of Discount Factor on Households Behavior Using DSGE Model.” *Studia Universitatis Vasile Goldis Arad – Seria Stiinte Economice* 33, no. 1 (2023d): 74-87.
- \_\_\_\_\_. “The Effects of Policy Change Regarding Health Expenditures on Households Behavior.” *Evidence Based Health Policy, Management & Economics* 6, no. 4 (2022a): 262-72.
- \_\_\_\_\_. and M. Shirafkan Lamsoo. “The Role of The Frisch Elasticity on Households' Behavior Using the Endogenous Discount Factor Model.” *Journal of the Faculty of Economics and Administrative Science* 12, no. 3 (2022): 221-50.
- \_\_\_\_\_. “Investigating the Role of Households’ Health Care Expenditures on the Iranian Households’ Welfare Using DSGE Framework.” *International Journal of Management, Accounting and Economics* 9, no. 8 (2022b): 505-16.
- \_\_\_\_\_. “Investigation of the Role of Change in Utility Function Components and Its Effect on Smooth the Dynamic Movement Path of Model Variables.” *Studies in Business and Economics* 17, no. 1 (2022c): 73-84.
- \_\_\_\_\_. “Investigating the Role of Financial Sanctions in Utility Function and Their Impact on Household Behavior.” *DLSU Business & Economics Review* 31 no. 1 (2021): 132-41.
- \_\_\_\_\_. “The Role of Tendency of Government Preference in an Optimal Fiscal Policy Model in the Presence of Agent Heterogeneity in A DSGE Framework.” *Quarterly Journal of Economical Modelling* 4, no. 44 (2018): 73-96.
- Javan-Noughabi, J., Z. Kavosi, and A. Faramarzi. “Identification Determinant Factors on Willingness to Pay for Health Services in Iran.” *Health Econ Rev* 7, no. 40 (2017): 1-6.
- Kahf, Monzer. “A Contribution to the Theory of Consumer Behavior in an Islamic Society, dalam Kurshid Ahmad.” *Studies in Islamic Economics*. Leicester: *International Centre for Research in Islamic Economics and The Islamic Foundation* (1980): 19-36.

- Kamarudin, A.A and S. Kassim. "Islamic Banking Sector Development and Economic Growth: Empirical Evidence from Malaysia." *International Journal of Economics, Management and Accounting* 30, no. 2 (2022): 451-80.
- Nasrindoost, M., M. Mehrjourirani, and M.A. Falahi. "The Study of Economics-Energy-Environment (3E) Efficiency in Iranian Industries." *Stable Economy* 2, no. 4 (2021): 87-118.
- Omar Mohammed, M. "Economic Consumption Model Revisited: Infaq based on Al Shaybani's Levels of Al- Kasb." *International Journal of Economics, Management & Accounting* 19, no. 3 (2011): 115-32.
- Sufian, F. "Size and Returns to Scale of The Islamic Banking Industry in Malaysia: Foreign Versus Domestic Banks." *Journal of Economics and Management* 14, no. 2 (2006): 147-75.
- Tavakoli, M.J. "Investigating the Relationship between Resistive Economy and Islamic Economics." *The Journal of Iran's Economic Essays; an Islamic approach* 16, no. 32 (2020): 89-119.
- Tavakolian, H., and A. Komijani. "Monetary Policy under Fiscal Dominance and Implicit Inflation Target in Iran: A DSGE Approach." *Journal of Economic Modeling Research* 2, no. 8 (2012): 87-117.
- Thornton, J.P. and S. Helms. "Afterlife Incentives in Charitable Giving." *Applied Economics* 45, no.19 (2013): 2779-791.
- Yasser, F. "Consumer Behavior in Islamic Perspective: An Empirical Analysis." *International Journal of Management Research and Emerging Sciences* 6, no. 1 (2016): 99-121
- Zaman, A. "Islamic Economics: A Survey of The Literature." *Islamic Studies*, 48, no. 4 (2009): 525-66.
- Zare, M.M., Z. Nasrollahi, and H. Parsa. "The Impacts of Gender Inequality on Macroeconomic Variables in The Framework of a DSGE Model." *Applied Theories of Economics* 7, no. 1 (2020): 29-60.
- Zarqa, M.A. "Islamization of Economics: The Concept and Methodology." *Islamic Economics* 16, no. 1 (2003): 3-42.





## **DRIVING FACTORS BEHIND M-COMMERCE ACCEPTANCE: THE MEDIATING ROLE OF INTENTION**

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### **ABSTRACT**

In recent decades, there has been substantial progress in the evolution of mobile commerce. This study, which delves into the impact of performance expectancy, effort expectancy, and perceived trust on accepting mobile commerce through intention, has significant implications for mobile commerce providers and organizations in Malaysia. The findings, derived from a two-phase structural equation modelling process and a convenience sampling method involving 390 survey questionnaires, reveal that perceived trust, performance expectancy, and effort expectancy substantially influence the intention to use mobile commerce. Furthermore, perceived trust indirectly influences the acceptance of mobile commerce through intention. Additionally, the acceptance of mobile commerce is greatly influenced by intention. The findings also demonstrated that the intention to accept mobile commerce fully mediates the relationship between perceived trust and the acceptance of mobile commerce. Therefore, these valuable findings can guide mobile commerce providers and organizations in their efforts to enhance mobile commerce adoption in Malaysia. These findings will significantly benefit scholars, researchers, marketers, and other individuals involved in the mobile commerce industry.

JEL Classifications: M1, M150, M3

Keywords: M-Commerce, Intention, Acceptance, Trust, Malaysia

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## 1. INTRODUCTION

Global proliferation of mobile commerce is experiencing a tremendous surge, driven mainly by the younger age group and mobile technology developments. This trend is particularly pronounced in Malaysia, where adults below 50 are increasingly using their smartphones for online shopping (MCMC, 2021). This development is not just a fad but a significant shift in consumer behavior that mobile commerce providers and organizations must consider (Barry, Haque and Jan, 2024a; Chan et al., 2022). The consistent and substantial increase in smartphone utilization has significantly boosted the popularity and effectiveness of mobile commerce applications. Mobile commerce apps have become essential in our daily lives as they enable us to handle our purchasing schedules and other crucial requirements effortlessly (Barry, Haque and Jan, 2024b; Huang, 2023; Patel et al., 2020; Malaquias and Hwang, 2019). According to Forbes, smartphone use is expected to contribute to a significant increase in global mobile commerce sales, reaching an impressive \$710 billion by 2025.

Developing countries, however, are expected to account for more than 90% of the new smartphone connections (Barry, 2024a; Barry and Ahasanul, 2024; Barry, Haque and Jan, 2024d). This can be attributed to the rapid progress made in mobile services, as indicated by Ashraf et al. (2021) and Patil et al. (2020). Based on a 2023 survey conducted by the Malaysian Communications and Multimedia Commission (MCMC), most Malaysians prefer using their mobile phones for transactions. The rapid increase in mobile phone utilization demonstrates the importance and ability to bring about significant future changes in mobile commerce apps. Despite the expectation that people will use smartphones for internet shopping, current data suggests that mobile commerce has not been widely embraced in Malaysia (Barry, Haque and Jan, 2024c; Yahaya, Hamid, and Nafi, 2022).

Introducing user-friendly smartphone-compatible applications has sparked a worldwide transformation in business methods, enhancing the acceptance rate for mobile commerce transactions among mobile commerce users (Siyal et al., 2021). Scholars have expressed curiosity in studying the factors that impact customer intention to accept mobile commerce (Barry, 2024a; Barry and Ahasanul, 2024). Moreover, people are keen on discovering characteristics that can improve customer loyalty in mobile

commerce adoption (Siyal et al., 2024; Pallant et al., 2022). Therefore, this study examines the driving factors behind m-commerce acceptance in a developing country such as Malaysia.

## 2. LITERATURE REVIEW

### 2.1 MOBILE COMMERCE

Online shopping has transformed from a rudimentary activity to a worldwide phenomenon in civilizations that heavily rely on information, such as the United States and Canada. This shift can be attributed mainly to the groundbreaking initiatives undertaken by Amazon and Alibaba (Kao and L'Huilier, 2022). Mobile commerce is the next phase of online commerce (Lucas, Lunardi, and Dolci, 2023). Mobile commerce refers to doing business transactions in a wireless environment. In their study, Mollick et al. (2023) provided a precise definition of mobile commerce as the incorporation of all transactions conducted using mobile devices. Essentially, it utilizes the recently developed wireless method of doing transactions. According to the latest study report, m-commerce encompasses transactions involving exchanging goods or rights, which are conducted via mobile devices connected to a computer network (Barry et al., 2024b).

Barry et al. (2024b) defined mobile commerce as using mobile network connectivity through electronic devices to transfer ownership or rights to products and services. He underlined that mobile commerce involves using information and communication technologies to combine value chains and commercial activities and oversee company partnerships. Mehedintu and Soava (2022) define mobile commerce (m-commerce) as conducting online transactions through a portable wireless device, including purchasing and selling products and services. Additionally, mobile commerce refers to any transaction through a wireless telecommunication network, directly or indirectly (Barry, 2024c). Similarly, mobile commerce is an extension of electronic commerce that enables people to interact with one another or enterprises wirelessly, regardless of time or location (Barry and Jan, 2018). Mobile commerce refers to any transaction using a wireless telecommunication network, as defined by Jin and Youn (2022).

## 2.2 UNIFIED THEORY OF ACCEPTANCE AND USE OF TECHNOLOGY (UTAUT)

Prior studies on consumer acceptance have primarily relied on established theories of technology acceptance, such as the Theory of Reasoned Action (TRA), Innovation Diffusion Theory (IDT), Technology Acceptance Model (TAM), and Theory of Planned Behavior (TPB). TAM is widely used to assess technology acceptance. Nevertheless, it has many disadvantages. A significant limitation is the absence of clear instructions on successfully utilizing and integrating mobile technologies (Barry et al., 2024a; 2024b). In 2003, Venkatesh et al. developed the Unified Theory of Acceptance and Use of Technology (UTAUT) theory by integrating eight well-established concepts from the existing literature. Thus, the researcher has chosen the individual variable and UTAUT (Venkatesh et al., 2003) model as the theoretical foundation of this study for the present research investigation because of its strong theoretical underpinning and because the UTAUT model has been applied in several studies involving mobile commerce and other technological research (Barry and Haque, 2024; Barry et al., 2024e; Hassaan and Yaseen, 2026).

However, the unified theory of acceptance and use of technology presented four key concepts: performance expectancy, effort expectancy, social influence, and facilitating conditions (Venkatesh et al., 2003). The usage behavior impacts how consumers embrace information technology (IT). Performance expectancy is related to perceived usefulness from the technology acceptance model and relative advantage from the diffusion of innovation theory (Anwar et al., 2024; de Andrés-Sánchez and Gené-Albesa, 2023). This study, however, will not consider facilitating conditions and social influence as its main objective is to examine the relationship between effort expectancy, performance expectancy, perceived trust, intention, and acceptance of mobile commerce. Nevertheless, the primary emphasis of the present study is the level of acceptance of mobile commerce among consumers in Malaysia.

Previous studies on user acceptance and usage of mobile commerce have employed the UTAUT model, as demonstrated by Tannady, Dewi, and Gilbert (2024), Chand and Kumar (2024), and Dagnoush and Khalifa (2021).

After carefully reviewing previous literature, the researcher chooses this model as the foundation for the current study on the driving factors behind the acceptance of mobile commerce among

consumers in Malaysia. Additionally, UTAUT offers a comprehensive perspective on the factors affecting technology adoption such as mobile commerce, providing a comprehensive method for comprehending user behavior (Mensah, and Khan, 2024). Moreover, UTAUT is well-positioned to capture the different forces that drive customer decisions in Malaysia's mobile commerce industry because of the complex nature of mobile commerce, which includes both technological and social components (Barry et al., 2024e). Hence, numerous studies pertaining to technology adoption have shown the UTAUT model to have excellent predictive power (García de Blanes Sebastián et al., 2024; Barry et al., 2024e; Lai et al., 2024; Barry and Haque, 2024). Hence, this theory is extremely useful for strategic planning and policy formation in Malaysia's mobile commerce landscape because it allows researchers to not only investigate the factors influencing acceptance of mobile commerce but also forecast future trends and behaviors.

### 2.3 PERFORMANCE EXPECTANCY

According to Venkatesh et al. (2003), performance expectancy refers to the extent to which an individual believes using the system will improve their job performance. Performance expectancy has a vital role in shaping behavioral intention, as stated by Venkatesh, Thong, and Xu (2012). The term "performance expectancy" is used in m-commerce to refer to user performance (Dagnoush and Khalifa, 2021). Chand and Kumar (2024) discovered that performance expectancy significantly influences the intention of m-payment users in the Western area of Fiji. Their study uncovered that expectations of performance and the conditions that facilitate it substantially impacted on customer intention to use mobile payment services.

Additionally, Abdullah, Othman, and Urus (2024) revealed that performance expectancy has a significant and positive relationship with the intention to accept mobile payments among working-age users in an emerging market such as Malaysia. Komara and Utami (2024) also found a significant positive link between performance expectancy and mobile banking adoption interest. Allahham and Ahmad (2024), however, revealed that performance expectancy has a significant and positive connection with mobile payment services adoption in supply chain firms. Similarly, Kumar et al. (2023), Rahardja et al. (2023), Barry and Jan (2018; 2016), and Ankadhitra, Christiandy, and Tamara (2023) revealed similar results.

Thus, drawing from the existing literature, the researcher put forward the subsequent hypothesis:

H1: Performance expectancy has a positive impact on the intention to accept mobile commerce.

## 2.4 EFFORT EXPECTANCY

Effort expectation is the level of ease in using a system, as defined by Venkatesh et al. (2003). Venkatesh et al. (2012) assert that the expectation of effort plays a vital role in influencing one's will to perform. Effort expectancy pertains to mobile commerce's ease of use and user-friendliness (Barry and Jan, 2018). Furthermore, Tannady et al. (2024) defined effort expectancy as the degree to which users perceive the effectiveness of using mobile commerce. Chand and Kumar (2024) discovered that effort expectancy significantly influences the intention of m-payment users in the Western area of Fiji.

Many scholars found that effort expectancy significantly impacts the intention to use mobile commerce. For instance, Suyanto et al. (2024) found that effort expectancy significantly influences the behavior intention among Quick Response Code Indonesian Standard (QRIS) users of the small and medium enterprises sector in Indonesia. Komara and Utami (2024) also found a significant and positive link between effort expectancy and mobile banking adoption interest. Similarly, Abdullah et al. (2024), Ankadhitra et al. (2023), Lee, Lee, and Choi (2023), Kumar et al. (2023), and Purwanto et al. (2023) revealed similar results. Thus, drawing from existing research, the researcher puts forward the following hypothesis:

H2: Effort expectancy has a positive impact on the intention to accept mobile commerce.

## 2.5 PERCEIVED TRUST

Trust in technology refers to the extent to which a user is ready to depend on technology and its outcomes (Mayer, Davis, and Schoorman, 1995, 718). However, "trust," or "electronic trust," refers to the customer's legitimate reliance on information acquired from a website or application. As a result, the customer gains the confidence to participate in online commercial transactions. Basdekidou and Papapanagos (2024) argue that a reputable and

morally upright firm is distinguished by competence, integrity, equity, and accountability attributes. Trust is vital in mobile commerce since consumers are less likely to participate in transactions when they perceive significant risk and uncertainty (Liébana-Cabanillas et al., 2024). This study investigates the factors influencing acceptance of mobile commerce and how they impact customers' intentions to purchase. The aim is to gain a deeper understanding of how consumers assess mobile commerce reliability.

Many scholars have proven that perceived trust significantly predicts the intention and acceptance of mobile commerce. For instance, Barry et al. (2024b) found that perceived trust significantly influences intention to accept mobile commerce among Malaysian mobile commerce users. Similarly, Komara and Utami (2024), Sutrisno (2023), Fitriasaki et al. (2024), Sugijono and Pratomo (2024), Kumar et al. (2023), and Lee et al. (2023) revealed similar results. Therefore, the researcher proposes the following hypotheses:

H3: Perceived trust has a positive impact on intention.

H4: Perceived trust has a positive impact on acceptance.

## 2.6 INTENTION

Successful technology adoption depends on the users' intention and actual utilization. Although there is a general intention to use technology, several reasons, such as inadequate resources (financial, time-related, and technical expertise) and negative past experiences, can impede individuals. Behavioral intention is a reliable indicator of customer behavior and acceptance of new technology (Zhang et al., 2012). The concept of behavioral intention is a crucial element in the theories of the Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT), as proposed by Davis (1989) and Venkatesh et al. (2003). Barry et al. (2024c) defined behavioral intention as a consumer's view of the possibility of participating in mobile commerce. The notion of mobile commerce has experienced significant progress in recent decades. Unlike prior research that mainly examined individuals' intentions to utilize mobile commerce, the present study examines customers' acceptance of mobile commerce. However, many scholars found that the intention to accept mobile commerce strongly predicts the acceptance of mobile commerce (Barry et al., 2024a; Nandru and Senthilkumar, 2024; Zaheer, Kashif, and Kropivnik, 2024; Zainab,

Sarwar, and Usop, 2024; Nani and Lina, 2022; Vărzaru et al., 2021; Barry and Jan, 2018; Barry, 2016). Therefore, based on these studies, the following hypothesis is proposed.

H5: Intention has a positive impact on the acceptance of mobile commerce.

## 2.7 MEDIATION EFFECT OF INTENTION

Several scholars have examined the role of intention in mediating the relationship between trust and the acceptance of mobile commerce. For instance, Barry et al. (2024b) demonstrated that consumer intention acts as a full mediator in the relationship between trust and the acceptance of mobile commerce among Malaysian consumers. This finding indicates that trust alone does not directly influence mobile commerce adoption; instead, trust shapes consumer intention, which in turn drives their acceptance of mobile commerce activities. Nguyen and Ha (2021) discovered that consumer intention plays a critical role in shaping the relationship between trust and the user acceptance of mobile commerce. Their findings suggest that trust exerts its influence on mobile commerce adoption indirectly, with intention serving as a significant intervening variable that translates trust into actual acceptance and usage behavior.

Additionally, Sutrisno (2023) identified that intention serves as a mediating factor in the relationship between trust and the acceptance of mobile commerce. This suggests that trust does not directly lead to mobile commerce acceptance; rather, it influences consumers' intentions, which subsequently drive their willingness to adopt and engage with mobile commerce activities. Sehat et al. (2024) further revealed that consumer intention serves as a full mediator in the relationship between trust and the acceptance of mobile commerce. This means that trust alone does not directly lead to mobile commerce adoption; instead, trust influences the formation of consumer intention, which then becomes the determining factor driving the acceptance and use of mobile commerce activities. Fati (2024) also revealed that consumer intention acts as a full mediator in the relationship between trust and the acceptance of mobile commerce. This finding suggests that trust does not have a direct influence on the acceptance of mobile commerce; rather, it shapes consumer intentions, which, in turn, play a crucial role in determining whether consumers are willing to adopt and use mobile commerce platforms. These studies highlight the significant

influence of intention in mediating the connection between perceived trust and the acceptance of mobile commerce. Therefore, based on these studies, the researcher proposes the following hypothesis:

H6: Intention mediates the relationship between perceived trust and acceptance.

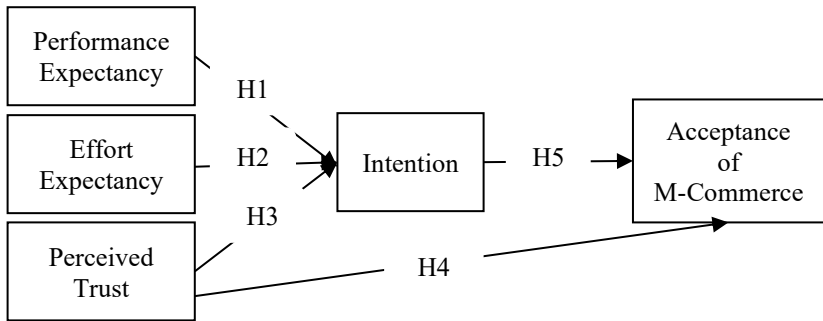


FIGURE 1  
Conceptual Framework

Figure 1 shows the conceptual framework of the study. The independent variables namely performance expectancy, effort expectancy, and perceived trust are positively relate to the mediating variable namely intention and the dependent variable namely the acceptance of m-commerce in Malaysia.

### 3. RESEARCH METHODOLOGY

The study utilized convenience sampling by delivering 400 survey questionnaires to customers who use smartphones and engage in mobile commerce within the Klang Valley area in Malaysia. The questionnaire items were rated on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Based on the study conducted by Hair et al. (2010a), the researcher determined that among the 400 questionnaires distributed to consumers only 385 were adequate for data analysis. All data screening methods were rigorously followed before conducting the primary analysis in this study. Following the data screening procedure, we employed the Statistical Packages for the Social Sciences (SPSS) application to perform a thorough analysis, which included reliability analysis, descriptive analysis, factor analysis, and structural equation

modelling. Using the AMOS software for structural analysis, the measurement model was assessed for goodness-of-fit, convergent and discriminant validity. The structural model was then used to validate the model and confirm the investigation's hypotheses.

#### 4. DATA ANALYSIS AND RESULTS

The study employed the Analysis of Moment Structure (AMOS-SEM) and Statistical Packages for the Social Sciences (SPSS) software to analyze the data (Hair et al., 2010a). Furthermore, the study encompassed factors, descriptive, and reliability analyses. To establish the study's measurement and structural model, a two-stage structural equation modelling technique is employed. The study's hypotheses were ultimately formulated. The investigation employed Cronbach's alpha coefficient to assess the reliability values for the constructs: PT = 0.765, PE = 0.818, EE = 0.908, INT = 0.925, and AMC = 0.902. Furthermore, the overall dependability was satisfactory, as indicated by Cronbach's  $\alpha$  coefficient of 0.945. Therefore, the following Table 1 illustrates the results of the reliability analysis.

TABLE 1  
Reliability Statistics

Constructs	Cronbach's $\alpha$	No. items
Perceived Trust	0.765	5
Performance Expectancy	0.818	5
Effort Expectancy	0.908	5
Intention	0.925	5
Acceptance of M-Commerce	0.902	5

Source: Authors' Computation

##### 4.1 DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS

Some 390 questionnaires were collected from smartphone users in Malaysia conducting mobile commerce, who were 18 years and above. The collected data resulted in 385 valid responses, consisting of 211 (54.8%) females and 174 (45.2%) males. Most participants, precisely 135 respondents (35.1%), were aged 18-27, while 130 consumers (33.8%) were 28-37, and 73 consumers (18.9%) were 38-47. Among all the consumers, only 47 (12.2%) were aged 41 and above. Among the responses, just 45 consumers (11.7%) were

married, while the majority, 340 consumers (88.3%), were single. The participants comprised 350 (90.9%) consumers from Malaysia, and only 35 (9.1%) consumers were Foreigners (Non-Malaysian). Regarding their educational background, 175 consumers (45.4%) graduated with a bachelor's degree, followed by 95 consumers (24.7%) with a master's degree and 58 consumers (15.1%) with a Diploma. Some 42 consumers possessed doctoral degrees, representing 10.9% of the total respondents. Table 2 illustrates the respondents' demographic characteristics.

TABLE 2  
Demographic Characteristics of the Respondents

Demographic variables		Research Sample (n = 385)	
		Frequency	Percentage (%)
Gender	Male	174	45.2
	Female	211	54.8
Age	18 – 27	135	35.1
	28 – 37	130	33.8
	38 – 47	73	18.9
	48 – Above	47	12.2
Nationality	Malaysian	350	90.9
	Non-Malaysian	35	9.1
Marital Status	Single	340	88.3
	Married	45	11.7
Level of Education	High School	15	3.9
	Diploma	58	15.1
	Bachelor	175	45.4
	Master	95	24.7
	PhD	42	10.9

Source: Author's Computation

#### 4.2 KMO AND BARTLETT'S TEST OF SPHERICITY

The unidimensionality of the scales was evaluated using the KMO and Bartlett's Tests (Table 3). The p-values for the five sample groups in the sphericity tests were less than 0.001. Furthermore, a confirmation with a coefficient of 0.910 was achieved, showing the suitability of the samples.

TABLE 3  
KMO and Bartlett's Tests

KMO Sampling Adequacy Measurement		0.910
Sphericity Test	Approx. Chi-Square	8225.246
	Degree of Freedom	375
	Significance	0.000

Source: Author's Computation

#### 4.3 EXPLORATORY FACTOR ANALYSIS

The factor loadings obtained from the factor analysis outcome (Table 4) were utilized to validate the accurate assignment of each survey item to its respective component. The results indicate that seven factors accounted for 77.163% of the variation in the survey items. Items such as AMC5, INT5, PE5, PT4, and PT5 were having factor loadings less than 0.5 and hence were not included in the data analysis as advised by Hair et al. (2010b) that any items with factor loadings below the threshold of 0.5, should be excluded in the data analysis otherwise it will affect the outcome of the analysis. Furthermore, based on exploratory factor analysis (EFA), Cronbach's alpha for each component exceeds the recommended minimum value of 0.7, as Hair et al. (2010b) suggested.

TABLE 4  
Loadings and Reliability of Scale

Item	EE	AMC	INT	PE	PT
EE1	0.727				
EE2	0.784				
EE3	0.804				
EE4	0.766				
EE5	0.711				
AMC1		0.777			
AMC2		0.807			
AMC3		0.855			
AMC4		0.840			
INT1			0.728		
INT2			0.661		
INT3			0.736		
INT4			0.755		

TABLE 4 (continued)

Item	EE	AMC	INT	PE	PT
PE1				0.817	
PE2				0.812	
PE3				0.642	
PE4				0.584	
PT1					0.831
PT2					0.751
PT3					0.883
Mean	4.084	3.977	4.027	3.747	2.814
SD	1.023	1.110	1.033	1.117	1.208
Cronbach's $\alpha$	0.908	0.905	0.932	0.823	0.770
CR	0.910	0.903	0.933	0.820	0.779
AVE	0.669	0.702	0.778	0.537	0.543

Source: Authors' computation

#### 4.4 CONVERGENT AND DISCRIMINANT VALIDITY

The researcher calculated each construct's average variance extracted (AVE) to evaluate convergent validity. They verified that each construct's average variance extracted (AVE) value was more significant than 0.5, as shown in Table 3 (Cheung et al., 2023). To assess the discriminant validity, the square root of the average variance extracted (AVE) was computed and subsequently compared to the inter-construct correlations. The results in Table 5 provide evidence of discriminant validity, as demonstrated by the square root of the Average Variance Extracted (AVE) for each construct being more significant than the correlations between each construct and other components (Cheung et al., 2023).

TABLE 5  
Construct Validity and Reliability

	CR	AVE	MSV	ASV	1	2	3	4	5
PE	0.820	0.537	0.476	0.266	0.732				
EE	0.910	0.669	0.542	0.317	0.637	0.818			
PT	0.779	0.543	0.030	0.007	-0.020	0.075	0.737		
INT	0.933	0.778	0.542	0.344	0.690	0.736	0.172	0.882	
ACC	0.903	0.702	0.361	0.202	0.371	0.601	0.091	0.569	0.838

Source: Author's computation

4.5 CONFIRMATORY FACTOR ANALYSIS

The confirmatory factor analysis results indicate that the RMSEA index is 0.064, which is lower than the criterion of 0.08. The degrees of freedom (DF) were 329, the Chi-square ( $\chi^2$ ) value is 842.396, and the Normed Chi-square ( $\chi^2/DF$ ) value is 2.560, which is lower than the criterion of 5.0. The CFI, GFI, TLI, and IFI values are above the criterion of 0.90, with respective values of 0.937, 0.932, 0.927, and 0.937. The results of this study align with the conclusions of earlier research conducted by Barry et al. (2024b) and Hu and Bentler (1999). This evidence suggests that it is necessary to evaluate the appropriateness of the structural model.

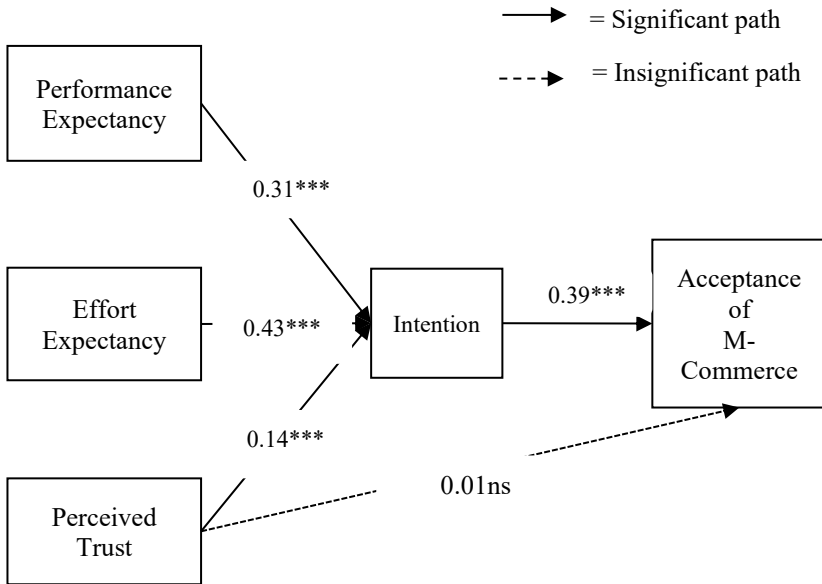


FIGURE 2  
 Driving Factors Behind M-Commerce Acceptance

Figure 2 demonstrates the driving factors behind the acceptance of m-commerce in Malaysia. Thus, performance expectancy, effort expectancy, and perceived trust are positively related to intention to accept m-commerce in Malaysia. Intention is positively related to the acceptance of m-commerce in Malaysia while playing a full mediating role between perceived trust and the acceptance of m-commerce. In contrast, perceived trust does not predict the acceptance of mobile commerce in Malaysia.

## 4.6 HYPOTHESES TESTING

The hypotheses were confirmed using the AMOS software. The results show that the RMSEA index is below the cutoff of 0.08 (0.065), the DF is 332, the Chi-square ( $\chi^2$ ) is 869.720, the Normed Chi-square ( $\chi^2/DF$ ) is below the cutoff of 5.0 (2.620), and the CFI, GFI, TLI, and IFI have values of 0.934, 0.928, 0.924, and 0.934, respectively, all surpassing the cutoff of 0.90. According to the structural model results, the predicted model performs better regarding fit indices and factor loadings. The outcome of the hypothesis test for the structural model is considered satisfactory. The outcome of the hypothesis is displayed in the following Table 6.

TABLE 6  
Hypotheses Testing

Hypotheses	Paths	Coeff ( $\beta$ )	<i>t-value</i>	<i>p-value</i>	Decision
H1	PE ----> INT	0.310	4.765	***	Supported
H2	EE ----> INT	0.431	7.216	***	Supported
H3	PT---->INT	0.139	3.736	***	Supported
H4	PT---->AMC	0.012	0.305	0.760	Not Support
H5	INT ---->AMC	0.386	7.341	***	Supported

Note: \*\*\* indicates significance level  $< 0.001$

Source: Authors' computation

The data presented in Table 6 indicates that the impact of performance expectancy on intention is 0.31. Using a significance threshold of 0.05, the results showed a statistically significant relationship ( $\beta = 0.31$ ,  $p < 0.001$ ). Therefore, the degree of performance expectancy significantly impacts the intention to accept mobile commerce. Therefore, H1 is supported.

Regarding H2, the data in Table 6 demonstrates that the amount of effort expectancy exerts a substantial impact of 0.43 on the intention. This result is significant. Using a significant level of 0.05, the results showed a statistically significant relationship ( $\beta = 0.43$ ,  $p < 0.001$ ). Therefore, the degree of effort expectancy significantly impacts the intention to accept mobile commerce. As a result, H2 is supported.

The correlation coefficient between perceived trust and intention is 0.14, as stated in Table 6. The results were statistically significant, meeting the significance criterion 0.05 ( $\beta = 0.14$ ,  $p < 0.001$ ). Therefore, how trust is perceived significantly impacts the

intention to accept mobile commerce. Consequently, H3 is subsequently supported.

Concerning H4, according to Table 6, the relationship between perceived trust and the acceptance of mobile commerce has a coefficient of 0.01. With a significant level of 0.05, the results showed insufficient evidence to support a statistically significant relationship ( $\beta = 0.01, p < 0.076$ ). Therefore, the perception of trust does not significantly influence the acceptance of mobile commerce. Thus, H4 is not supported.

Table 6 shows that the impact of intention on the acceptance of mobile commerce is 0.4, which is consistent with hypothesis H5. Using a significance level of 0.05, the results showed statistical significance ( $\beta = 0.4, p < 0.001$ ). Therefore, the intention to accept mobile commerce significantly influences the acceptance of mobile commerce. As a result, H5 is supported.

Table 7 illustrates the role of intention in mediating the relationship between perceived trust and the acceptance of mobile commerce. The indirect impact analysis reveals that intention is a full mediator ( $\beta = 0.053, p < 0.001$ ). Thus, H6 is supported.

#### 4.7 MEDIATION

This study investigated the mediating role of intention in the relationship between perceived trust and the acceptance of mobile commerce. The findings from a study including 2000 samples using bootstrapping and 95% confidence interval analysis suggest that intention plays a complete mediating role in the connection between perceived trust and acceptance of mobile commerce. The value of  $\beta$  is 0.053, and p-value is less than 0.001. Therefore, the result of the mediation is presented in the following Table 7.

TABLE 7  
Mediation Effect of Intention

Hypothesis	Path	Total Effect	Direct Effect	Indirect Effect	Result
H6	PT ---> INT ---> AMC	0.542***	0.012	0.53***	Full Mediation

Note: \*\*\* indicates significance level  $< 0.001$

Source: Authors' computation

## 5. DISCUSSION AND CONCLUSION

### 5.1 DISCUSSION

This study investigated the driving factors behind mobile commerce acceptance in Malaysia, employing the Unified Theory of Acceptance and Use of Technology (UTAUT) as a theoretical underpinning. The findings demonstrated that customers both endorsed and acknowledged the potential of mobile commerce.

The researcher investigates the mediating effect of customers' intention in the relationship between perceived trust and their acceptance of mobile commerce (H6), which revealed full mediation. The result supports hypothesis H5, which suggests that customers' intention impacts their acceptance of mobile commerce. By understanding this concept, mobile commerce providers can modify their experiences and actions to meet consumer needs, hence enhancing their effectiveness in conducting mobile commerce transactions.

Another significant finding confirms the impact of performance expectancy (H1), effort expectancy (H2), and perceived trust (H3) on customers' intention to accept mobile commerce. These findings offer valuable insights into the correlation between consumers' perception of mobile commerce and their acceptance intention, enabling us to enhance our comprehension of this subject.

Consumers' intention to accept mobile commerce will increase if mobile commerce providers improve their technology, such as websites or applications, to be reliable, advantageous, and user-friendly. The significant relationship between perceived trust, performance expectancy, and effort expectancy significantly impacts the intention to accept mobile commerce. Hence, mobile commerce providers must utilize intelligent marketing choices and integration techniques to increase consumer acceptance of mobile commerce.

To improve the acceptance of mobile commerce, providers of mobile commerce applications or websites should organize seminars or training sessions to familiarize consumers with the features and procedures of mobile commerce. This is significant because acceptance intention plays a crucial role in determining mobile commerce's acceptance level. Furthermore, developing a robust support system is crucial to handle any problems or questions consumers may have when using mobile commerce. Mobile commerce providers should prioritize optimizing their websites or application interfaces to ensure they are user-friendly and functional,

enabling efficient consumer interaction with technology. In addition, they must interact with consumers, addressing any concerns related to confidentiality and data protection and reinforcing the security and privacy standards in place while using mobile commerce. They must protect consumers' financial information when participating in mobile commerce. As a result, this will encourage customers to engage in mobile commerce and stimulate mobile commerce industry expansion in Malaysia, ultimately creating a significant impact on the Malaysian economy.

The Malaysian Communications and Multimedia Commission (MCMC) and other policymakers in Malaysia should implement robust policies to guarantee superior internet connectivity in the communications sector. This will enable mobile commerce providers to offer exceptional services, encouraging consumers to participate in mobile commerce activities. To promote mobile commerce among customers in Malaysia, mobile commerce providers need to establish robust partnerships with website and app designers, smartphone manufacturers, and telecommunication companies.

## 5.2 CONCLUSION

This study explains to what extent Malaysian customers have embraced mobile commerce. Nevertheless, consumer intention to use mobile commerce is the main factor determining its acceptability. Consumers' intention to accept mobile commerce, however, is influenced by performance expectancy, effort expectancy, and perceived trust. This study discovered that perceived trust, performance expectancy, and effort expectancy significantly impacted the intention to accept mobile commerce. Our research demonstrates that the relationship between perceived trust and acceptance of mobile commerce is fully mediated by acceptance intention. More precisely, the influence of the intention to accept mobile commerce serves as a full mediator in the connection between perceived trust and the acceptance of mobile commerce.

Before recommending suggestions for future research, we acknowledge the limitations of this study. Like any other study, this research is constrained by its implementation and content limitations, primarily because of persons, materials, and time constraints. The core foundation of this research is the model itself, or the extension developed from the model. Consequently, the current factors include performance expectancy, effort expectancy, perceived trust, and

intention. All the elements are one-dimensional, and the outcomes are primarily conceptual. Performance expectancy can be classified into four categories: work performance, convenience, and entertainment value. This will facilitate the development of more comprehensive acceptance models and provide specific recommendations regarding the acceptability of mobile commerce among customers.

Subsequent future studies might investigate many determinants that impact the intention of consumers to accept mobile commerce. This study focuses exclusively on consumers 18 years and above who own smartphones and participate in mobile commerce. This study investigates the behavior of smartphone users by analyzing the acceptance of mobile commerce, performance expectancy, effort expectancy, perceived trust, and acceptance intention. Future studies could integrate methodologies considering social influence, facilitating conditions, perceived cost, individual creativity, privacy, and security. Future researchers may also conduct cross-national comparisons of consumers to assess their acceptance of mobile commerce. Further investigation could examine the methodology utilized in this study in a different context to determine the degree to which consumers accept new technology, such as e-commerce, e-payment, or social commerce.

A critical limitation of this study is its failure to incorporate facilitating conditions and social influence into the current investigation. Therefore, future research could include these two variables to examine the driving factors behind mobile commerce acceptance in Malaysia. Due to mobile commerce's novelty, additional study is required to demonstrate its impact on the scope of the educational process. Further investigation is necessary to determine mobile commerce effectiveness and acceptance among customers and gain valuable knowledge to improve its acceptance among consumers in Malaysia.

## REFERENCES

- Abdullah, N.J., I.W. Othman, and S.T. Urus. "Modeling Mobile Payment Acceptance Among Working-Age Users in the Emerging Market." *Corporate and Business Strategy Review* 5, no. 1 (2024): 137-47.
- Allahham, M., and A. Ahmad. "AI-induced Anxiety in the Assessment of Factors Influencing the Adoption of Mobile Payment Services in Supply Chain Firms: A Mental

- Accounting Perspective.” *International Journal of Data and Network Science* 8 no. 1 (2024): 505-14.
- Ankadhitra, A., C. Christiandy, and D. Tamara. “Usage Analysis of Mobile Payment System to Consumer Continuance Intention in Jabodetabek.” *Indonesian Journal of Multidisciplinary Science* 2 no. 12 (2023): 4244-254.
- Anwar, R.N., V. Gaffar, D. Disman, and C. Furqan. “Mobile Payment Adoption: Systematic Literature Review.” *Migration Letters* 21, no. 4 (2024): 975-84.
- Barry, M. “Factors Affecting the Use of Mobile Commerce (m-commerce) among Young Consumers: An Empirical Study in Malaysia.” Master’s Dissertation. Malaysia: International Islamic University Malaysia, 2016.
- \_\_\_\_\_. “The Integration of Technology Acceptance Model and Theory of Planned Behaviour to Determine Consumers’ Intention to Use Mobile Commerce in Malaysia.” *Scope* 14 no. 3 (224a): 681–708.
- \_\_\_\_\_. “What Drives Smartphone Users to Conduct Mobile Commerce Transactions in Malaysia?” In *International Research Conference on Education and Multidisciplinary Studies (IRCEMS) 2024, Harvard Club of Boston*, Boston, Massachusetts, U.S.A. (2024b): 11 <https://londoninstitutesd.co.uk/aricstem-boston-2024/>
- \_\_\_\_\_. “What drives University Students’ Intention to Use Mobile Commerce: A Structural Equation Modelling Approach.” In the *4<sup>th</sup> International Postgraduate Research Conference 2024, Universiti Sultan Zainal Abidin (UniSZA), Kuala Terengganu*. (2024c): 65. <https://www.unisza.edu.my/iprc2024/>
- \_\_\_\_\_, and M.T. Jan. “What Drives Social Networking Users to Use Mobile Commerce.” *American Journal of Social Sciences* 1 (2016): B6-B16. <http://www.ASRAresearch.org/ajss-vol-1-no-1-2016/>.
- \_\_\_\_\_, and M.T. Jan. “Factors Influencing the Use of M-Commerce: An Extended Technology Acceptance Model Perspective.” *International Journal of Economics, Management and Accounting* 26 no. 1 (2018): 157-83.
- \_\_\_\_\_, A.A. Haque. “Examining the Determinants of Mobile Commerce Adoption through UTAUT: A Structural Equation Modelling.” *Scope* 14, no. 2 (2024): 1603 – 619.

- \_\_\_\_\_, A.A. Haque, and M.T. Jan. "Mobile Commerce Adoption in Malaysia: A Conceptual Framework." *Open Journal of Economics and Commerce* 5 no. 1 (2024a): 4 - 12.
- \_\_\_\_\_, Haque, A.A., and M.T. Jan. "Factors Affecting the Intention to Use Mobile Commerce in Malaysia: An Integration of TAM And IS success model." *International Journal of Academic Research in Business and Social Sciences* 14, no. 3 (2024b): 726-53.
- \_\_\_\_\_, A.A. Haque, and M.T. Jan. "An Analysis of the Factors Affecting University Students' Intention to Use Mobile Commerce: An Extended TPM." *International Journal of Academic Research in Economics and Management Sciences* 13, no. 2 (2024c): 89 - 107.
- \_\_\_\_\_, A.A. Haque, and M.T. Jan. "From Expectancy to Acceptance: Modelling the Impact of Performance and Effort Expectations on Mobile Commerce Intentions." *Sriwijaya International Journal of Dynamic Economics and Business* 8 no. 1 (2024e): 65 – 86.
- \_\_\_\_\_, A. Haque, and M.T. Jan. "Factors Influencing the Intention to Use M-Commerce in Malaysia: An extended IS success model." *International Journal of Advances in Applied Sciences* 13, no. 4 (2024d): 957 – 69.
- Basdekidou, V.A., and H. Papanagos. "The Mediating Role of the Corporate Culture in the Relationship between Blockchain Adoption and ESG Performance." *SSRN 4636791* (2024).
- Chan, X.Y., M.K. Rahman, A.A Mamun, A. Salameh, W.M.H. Wan Hussain, and S.S. Alam. "Predicting the Intention and Adoption of Mobile Shopping During the COVID-19 Lockdown in Malaysia." *Sage Open* 12, no. 2 (2022): 1-17.
- Chand, S.S., and B.A. Kumar. "Applying the UTAUT Model to Understand M-Payment Adoption: A Case Study of Western Part of Fiji." *Journal of the Knowledge Economy* (2024): 1–27.
- Cheung, G.W., H.D. Cooper-Thomas, R.S. Lau, and L.C. Wang. "Reporting Reliability, Convergent and Discriminant Validity with Structural Equation Modeling: A Review and Best-practice Recommendations." *Asia Pacific Journal of Management*, (2023): 1-39.
- Dagnoush, S.M., and G.S. Khalifa. "The Relationship Between Users' Performance Expectancy and Users' Behavioral Intentions to Use Mobile Commerce Transactions in the

- Libya Context.” *Asia-Pacific Journal of Management and Technology (AJMT)* 2, no. 2 (2021): 22-9.
- Davis, F.D. “Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology.” *MIS Quarterly*, 13, no. 3 (1989): 319–40.
- de Andrés-Sánchez, J., and J. Gené-Albesa. “Explaining Policyholders’ Chatbot Acceptance With an Unified Technology Acceptance and Use of Technology-Based Model.” *Journal of Theoretical and Applied Electronic Commerce Research* 18, no. 3 (2023): 1217-237.
- Fitriasari, F., N.A. Auzairy, R.A. Rahim, and H.O. Zaki. “A Systematic Review of the Behavior Intention on Mobile Banking and Stock Trading.” *Multidisciplinary Reviews* 7, no. 6 (2024): e2024112.
- García de Blanes Sebastián, M., J.R. Sarmiento Guede, A. Azuara Grande, and A.F. Filipe. “UTAUT-2 Predictors and Satisfaction: Implications for Mobile-learning Adoption among University Students.” *Education and Information Technologies* (2024): 1-37.
- Hair, J.F., W.C. Black, B.J. Babin, and R.E. Anderson. *Advanced Diagnostics for Multiple Regression: A Supplement to Multivariate Data Analysis*. Pearson Prentice Hall Publishing, 2010a.
- \_\_\_\_\_, W.C Black, B.J. Babin, R.E. Anderson, and R.L. Tatham. *Multivariate Data Analysis*. Prentice Hall, 816, 2010b.
- Hassaan, M., and A. Yaseen. “Factors Influencing Customers’ Adoption of Mobile Payment in Pakistan: Application of the Extended Meta-UTAUT Model.” *Journal of Science and Technology Policy Management* 17, no. 3 (2026): 687-709.
- Hu, L.T., and P.M. Bentler. “Cutoff Criteria for Fit Indexes in Covariance Structure Analysis: Conventional Criteria Versus New Alternatives.” *Structural Equation Modeling: A Multidisciplinary Journal* 6 (1999): 1–55.
- Huang, Y.C. “Integrated Concepts of the UTAUT and TPB in Virtual Reality Behavioral Intention.” *Journal of Retailing and Consumer Services* 70 (2023): 103127.
- Jin, S.V., and S. Youn. “They Bought It, Therefore I Will Buy It: The Effects of Peer Users' Conversion as Sales Performance and Entrepreneurial Sellers' Number of Followers as Relationship Performance in Mobile Social Commerce.” *Computers in Human Behavior* 131 (2022): 107212.

- Kao, W.K., and E.A. L'Huillier. "The Moderating Role of Social Distancing in Mobile Commerce Adoption." *Electronic Commerce Research and Applications* 52 (2022): 101116.
- Komara, E., and D.T. Utami. "The Effect of Customer Satisfaction, E-Word of Mouth, and Initial Trust on Livin's Mobile Banking Adoption Interest." *Jurnal Manajemen (Edisi Elektronik)* 15, no. 1 (2024): 194-203.
- Kumar, R., R. Singh, K. Kumar, S. Khan, and V. Corvello. "How Does Perceived Risk and Trust Affect Mobile Banking Adoption? Empirical Evidence from India." *Sustainability* 15, no. 5 (2023): 4053.
- Lai, C.Y., K.Y. Cheung, C.S. Chan, and K.K. Law. "Integrating the Adapted UTAUT Model with Moral Obligation, Trust and Perceived Risk to Predict ChatGPT Adoption for Assessment Support: A Survey with Students." *Computers and Education: Artificial Intelligence* 6 (2024): 100246.
- Lee, C.H., H.N. Lee, and J.I. Choi. "The Influence of Characteristics of Mobile Live Commerce on Purchase Intention." *Sustainability* 15, no. 7 (2023): 5757.
- Liébana-Cabanillas, F., Z. Kalinic, F. Muñoz-Leiva, and E. Higuera-Castillo. "Biometric M-payment Systems: A Multi-Analytical Approach to Determining Use Intention." *Information & Management* 61, no. 2 (2024): 103907.
- Lucas, G.A., G.L. Lunardi, and D.B. Dolci. "From E-Commerce to M-Commerce: An Analysis of the User's Experience with Different Access Platforms." *Electronic Commerce Research and Applications* 58 (2023): 101240.
- Malaquias, R.F., and Y. Hwang. "Mobile Banking Use: A Comparative Study with Brazilian and US Participants." *International Journal of Information Management* 44 (2019): 132-40.
- Mayer, R.C., J.H. Davis, and F.D. Schoorman. "An Integrative Model of Organizational Trust." *Academy of Management Review* 20 no. 3 (1995): 709-34.
- MCMC. "Hand Phone Users Survey Report. 2021." (2021). <https://www.mcmc.gov.my/skmmgovmy/media/General/pdf/2/FULL-REPORT-HPUS-2021.pdf>
- MCMC. "Communication and Multimedia Fact and Figures." (2023). [https://www.mcmc.gov.my/skmmgovmy/media/General/pdf/2/CM-3Q-2023\\_BI.pdf](https://www.mcmc.gov.my/skmmgovmy/media/General/pdf/2/CM-3Q-2023_BI.pdf).

- Mehedintu, A., and G. Soava. "A Hybrid SEM-neural Network Modeling of Quality of M-Commerce Services under the Impact of the COVID-19 Pandemic." *Electronics* 11, no. 16 (2022): 2499.
- Mensah, I.K., and M.K. Khan. "Unified Theory of Acceptance and Use of Technology (UTAUT) Model: Factors Influencing Mobile Banking Services' Adoption in China." *SAGE Open* 14, no. 1 (2024): 1-18.
- Mollick, J., Cutshall, R., Changchit, C., and Pham, L. "Contemporary Mobile Commerce: Determinants of Its Adoption." *Journal of Theoretical and Applied Electronic Commerce Research*, 18 no. 1 (2023): 501-23.
- Nandru, P., and S.A. Senthilkumar. "Exploring the Factors Affecting Mobile Payment Adoption Intention Among Women Street Vendors in India." *SDMIMD Journal of Management* 15, no. 1 (2024): 41–52.
- Nani, D.A., and L.F. Lina. "Determinants of Continuance Intention to Use Mobile Commerce During the Emergence of COVID-19 in Indonesia: DeLone and McLean Perspective." *Sriwijaya International Journal of Dynamic Economics and Business* 5, no. 3, (2022): 261 - 72.
- Nguyen, G., and M.T. Ha. "The Role of User Adaptation and Trust in Understanding Continuance Intention Towards Mobile Shopping: An Extended Expectation-Confirmation Model." *Cogent Business & Management* 8 (2021): 1980248.
- Pallant, J.I., J.L. Pallant, S.J. Sands, C.R. Ferraro, and E. Afifi. "When and How Consumers Are Willing to Exchange Data with Retailers: An Exploratory Segmentation." *Journal of Retailing and Consumer Services* 64 (2022): 102774.
- Patel, V., K. Das, R. Chatterjee, and Y. Shukla. "Does the Interface Quality of Mobile Shopping Apps Affect Purchase Intention? An Empirical Study." *Australasian Marketing Journal (AMJ)* 28, no. 4 (2020): 300 - 09.
- Purwanto, E., R. Sjarief, A. Dawan, S. Kurniawan, N. Pertiwi, and N. Zahra. "The Acceptance of Electronic Payment Among Urban People: An Empirical Study of the C-UTAUT-IRT Model." *Journal of Law and Sustainable Development* 11, no. 2 (2023): e559.
- Rahardja, U., C.T. Sigalingging, P.O.H. Putra, A. Nizar Hidayanto, and K. Phusavat. "The Impact of Mobile Payment Application Design and Performance Attributes on

- Consumer Emotions and Continuance Intention.” *Sage Open* 13, no. 1 (2023): 1-18.
- Sehat, N.S., S.R. Daud, K.S. Ahmad, I.L. Suhaime, and J. Jogeran. “Acceptance Factors Affecting the Intention to Use Mobile Payments: QR Code Applications.” *Information Management and Business Review* 16, no. 1 (2024): 287 - 304.
- Siyal, A.W., H. Chen, S.J. Shah, F. Shahzad, and S. Bano. “Customization at a Glance: Investigating Consumer Experiences in Mobile Commerce Applications.” *Journal of Retailing and Consumer Services* 76 (2024): 103602.
- Siyal, S., C. Xin, W.A. Umrani, S. Fatima, and D. Pal. “How Do Leaders Influence Innovation and Creativity in Employees? The Mediating Role of Intrinsic Motivation.” *Administration & Society* 53, no. 9 (2021): 1337-361.
- Sugijono, V.M., and L.A. Pratomo. “The influence of hedonic motivation, perception of online prices, access to information, and online trust towards attitude and purchase intention on e-commerce platform.” *Devotion: Journal of Research and Community Service* 5, no. 1 (2024): 88-100.
- Sutrisno, S. “Analysis of Factor Leading to Mobile Commerce Adoption in Semarang City.” *JURNAL IPTEKKOM Jurnal Ilmu Pengetahuan & Teknologi Informasi* 25, no. 2 (2023): 205-24.
- Suyanto, M.A., L.K.C. Dewi, D. Dharmawan, D. Suhardi, and S. Ekasari. “Analysis of the Influence of Behavior Intention, Technology Effort Expectancy, and Digitalization Performance Expectancy on Behavior to Use of QRIS Users in Small Medium Enterprises Sector.” *Jurnal Informasi dan Teknologi*, (2024): 57-63.
- Tannady, H., Dewi, C.S., and Gilbert. “Exploring Role of Technology Performance Expectancy, Application Effort Expectancy, Perceived Risk, and Perceived Cost on Digital Behavioral Intention of GoFood Users.” *Jurnal Informasi dan Teknologi* 6, no. 1 (2024): 80-5.
- Vărzaru, A.A., C.G. Bocean, C.C. Rotea, and A.F. Budică-Iacob. Assessing Antecedents of Behavioral Intention to Use Mobile Technologies in E-Commerce. *Electronics* 10, no. 18 (2021): 2231.
- Venkatesh, V., M.G. Morris, G.B. Davis, and F.D. Davis. “User Acceptance of Information Technology: Toward a Unified View.” *MIS Quarterly* (2003): 425-78.

- \_\_\_\_\_, J.Y. Thong, and X. Xu. "Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology." *MIS Quarterly* 36, no. 1 (2012): 157–78.
- Yahaya, S., S.N.A. Hamid, and S.N.M. Nafi. "Determinants for m-Commerce Adoption in Malaysian SMEs: A Conceptual Framework." *International Journal of Business and Economy* 4, no. 1 (2022): 138-49.
- Zaheer, N., M. Kashif, and S. Kropivnik. "Exploring Factors Affecting Pakistani Students' Intentions to Accept and Use Mobile Advertising: A UTAUT2 Perspective." *Teorija in Praksa* (2024): 93 – 114.
- Zainab, S., M.A. Sarwar, and R. Usop. "Factors Influencing Intentions to Use Mobile Payments: An Entrepreneurial Perspective." *Journal of Entrepreneurship and Business Venturing* 4, no. 1 (2024): 152-72.



## **THE INFLUENCE OF HEALTHCARE SERVICE QUALITY AND HOSPITAL REPUTATION ON PATIENT LOYALTY: THE MEDIATING ROLE OF PATIENT EXPERIENCE**

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### **ABSTRACT**

This study explores how healthcare service quality, hospital reputation and brand, and patient experience influence patient loyalty, emphasizing the mediating role of patient experience. Control variables such as gender, education level, and type of health insurance were also considered. The research was conducted at a hospital in East Java and involved 165 inpatients aged 18 years and over. It was analyzed using Partial Least Squares Structural Equation Modelling (PLS-SEM). The findings reveal that patient experience is the strongest determinant of loyalty, followed by healthcare service quality, hospital reputation, and brand. Among the control variables, education level was found to have a significant impact on patient loyalty, whereas gender and type of health insurance had a limited effect. The analysis shows that hospital reputation and brand play a crucial role in shaping patient experience, which mediates the impact of both on patient loyalty. The model demonstrates strong predictive relevance, explaining variance in both patient experience and loyalty, indicating its robustness in capturing these dynamics. However, the cross-sectional design of the study and its focus on a single hospital limit the generalizability of the results and the ability to capture temporal changes. Future research

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should be conducted in multiple healthcare settings and adopt longitudinal designs to explore additional factors, such as socioeconomic and cultural influences. This research contributes to the field by emphasizing the importance of hospital reputation and brand, healthcare service quality, and educational level in fostering patient loyalty, and by providing actionable insights for improving patient-centered care through strategic enhancements to experience and service delivery.

JEL classification: I18, M31, M38, C12

Keywords: Healthcare service quality, Hospital reputation and brand, Patient experience, Patient loyalty, Variable control

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## 1. INTRODUCTION

Hospitals today face increasing competition among medical service providers, influenced by factors such as open market policies, population growth, and increasing health awareness. The growing demand for healthcare services emphasizes the vital role of these services in shaping public satisfaction and trust in hospitals. Providing high-quality services and ensuring patient safety are crucial in reducing negative perceptions and strengthening patient loyalty. Hospitals are therefore advised to adopt a customer-oriented approach, focusing on building a positive reputation and brand within the community, and on improving service quality to ensure patient satisfaction and loyalty.

Patient loyalty depends on a hospital's ability to build strong relationships with patients, by understanding and meeting their needs effectively. Extensive research emphasizes the role of service quality in health care, especially in hospital settings. Several studies (Lubis et al., 2021; Dewi et al., 2021; Sadiartha and Apsari, 2018) highlight the significant influence of service quality on loyalty. In addition, the importance of patient-preferred service attributes, such as room availability, in increasing patient satisfaction and readiness to pay higher costs has also been shown to be significant (Suess and Mody, 2017). Holistic improvement in service quality across all hospital functions is identified as key to achieving excellence in service.

Advocating the use of a customer experience framework that focuses on service quality, the effort aims to encourage positive interactions between staff and patients (Hunter-Jones et al., 2020). The role of services, especially during the pandemic, in improving

health outcomes through quality medical services, financial savings, and convenience, is also emphasized (Alshiha, 2021). In the hospital context, image plays a key role in shaping loyalty dynamics. A positive hospital reputation and brand can increase loyalty, while a negative hospital reputation and brand can inhibit re-engagement with hospital services or products. Therefore, image management is the main focus to increase loyalty (Purnama et al., 2024).

Research shows that a hospital's reputation and brand are influenced by various factors, including the quality of its services, the adequacy of its equipment and the competency of its medical personnel. Improving a hospital's reputation and brand is important because it has a direct and indirect influence on loyalty (Jiang and Zhang, 2016).

Against this backdrop, the present study aims to explore the role of patient experience as a mediator between healthcare service quality and patient loyalty at Sakinah Islamic Hospital. The focus is on issues relating to poor service, particularly with regard to the registration process, waiting times, and waiting room comfort. The study seeks to provide a deeper understanding of how healthcare service quality, hospital reputation, brand and patient experience influence patient loyalty. Despite limitations in the existing literature, this study seeks to address this gap by providing valuable insights for healthcare practitioners and researchers.

## 2. LITERATURE REVIEW

This study defines healthcare service quality as the extent to which hospital services meet or exceed patient expectations. This encompasses medical expertise, friendliness, accessibility and supporting facilities. Drawing on (Laver et al., 2020) framework of structure, process and outcome, healthcare service quality was measured using (Parasuraman and Grewal, 2000) SERVQUAL model, which includes five dimensions: tangibles, reliability, responsiveness, assurance and empathy. The study examines the relationships between healthcare service quality, hospital reputation and branding, patient experience, and patient loyalty, emphasizing the mediating role of patient experience in the context of Indonesian hospitals.

Healthcare service quality incorporates several critical factors designed to meet customer expectations and needs. Eight key indicators detail these aspects: medical staff competency, facility availability, treatment effectiveness, cleanliness, emergency

response, communication with patients, waiting time, and patient safety. These indicators are based on frameworks from Darzi et al. (2023).

Hospital reputation and brand refer to consumer perceptions influencing decisions to use hospital services, measured through eight main indicators: public trust, media reporting, patient testimonials, recognition and awards, branding and marketing, community involvement, innovation and technology, and information transparency. These dimensions are drawn from Hazimah and Azis (2022).

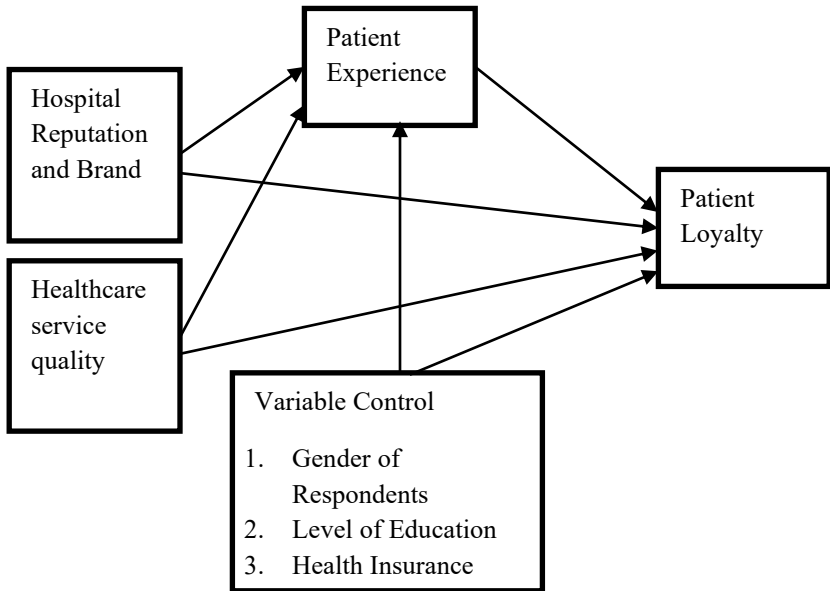
Patient experience, defined as the knowledge gained from interactions with service providers, influences perceptions and motivations. It is measured through eight indicators: ease of registration, waiting room comfort, staff friendliness, care services, medical information, postcare support, respect for privacy, and accessibility (Akthar, Nayak, and Pai, 2023).

Patient loyalty is conceptualized as a consistent commitment to choosing a service despite external influences, measured by indicators such as willingness to return, recommendations to others, overall satisfaction, trust in services, expectancy congruence, visit frequency, feelings of respect, and emotional loyalty (Gül, Helvacıoğlu, and Saraçlı, 2023).

The interactions among these variables reveal that healthcare service quality and hospital reputation and brand influence customer experience, which, in turn, fosters loyalty (Tasci and Semrad, 2016). Positive perceptions of service quality and reputation encourage loyalty (Singh et al., 2023). The study highlights patient experience as a mediating factor in building loyalty, addressing a gap in prior literature that often focuses on direct relationships between service quality and loyalty (Patmawati and Andjarwati, 2023). By exploring how patient experience, including perceptions of healthcare service quality and hospital reputation and brand, shapes these relationships, this research provides practical insights for hospital managers seeking to enhance patient loyalty.

This study affirms the need for further research into the mediating role of patient experience in the relationship between healthcare service quality, hospital reputation and brand, and patient loyalty, as illustrated in the proposed research model (Figure 1). It provides a valuable theoretical and practical contribution to improving healthcare services and fostering patient loyalty in the sector.

FIGURE 1  
Proposed Research Model



Based on the literature, the following hypothesis can be formulated:

- H1: Healthcare service quality has a positive effect on patient experience.
- H2: Hospital reputation and brand have a positive influence on patient experience.
- H3: Healthcare service quality has a positive effect on patient loyalty.
- H4: Hospital reputation and brand have a positive effect on patient loyalty.
- H5: Patient experience has a positive effect on patient loyalty.
- Ha1, 2, 3: Variable control (gender, education and health insurance status) has a positive effect on patient experience.

- Hb1, 2, 3: Variable control (gender, education and health insurance status) has a positive effect on patient loyalty.
- Hc1, 2, 3: Patient experience mediates the relationship between Variable control (gender, education and health insurance status) on patient loyalty
- H6: Patient experience mediates the relationship between healthcare service quality on patient loyalty.
- H7: Patient experience mediates the relationship between hospital reputation and brand on patient loyalty.

### 3. RESEARCH METHOD

#### 3.1 RESEARCH DESIGN

This study adopts an explanatory approach to analyze the relationships among healthcare service quality, hospital reputation and brand, patient experience, and patient loyalty through hypothesis testing. Cross-sectional data was utilized, which is considered appropriate for exploratory objectives and the resource constraints faced. While a longitudinal approach could capture changes in patient experience and patient loyalty over time, cross-sectional data remains relevant for identifying relationships between variables at a specific point in time (Creswell et al., 2014). This approach allows for a quick mapping of current conditions without requiring the extensive time and resources needed for longitudinal studies (Gomm, 2008). Limitations of not capturing long-term dynamics are acknowledged, however longitudinal studies are recommended for future research to better understand changes in patient experience and patient loyalty.

This study incorporates control variables such as gender, education level, and type of health insurance to examine their influence on patient experience and patient loyalty. In the Partial Least Squares (PLS) analysis, these variables are modeled as exogenous factors that may directly or indirectly affect latent variables. This aim reducing bias stemming from demographic differences and insurance status, which can impact perceptions of healthcare service quality and hospital reputation and brand (Ahmed et al., 2025). For example, patients with higher education levels may be more critical in assessing services, while gender may influence

interactions with medical staff and overall patient experience. Additionally, the type of insurance could affect the range of services received, thereby influencing experience and patient loyalty levels.

The potential for control variables to act as mediators or moderators is also recognized in this study, acknowledging their possible confounding effects. This consideration enhances the robustness of the findings and highlights areas for further investigation in understanding the nuanced roles these variables may play in shaping patient experience and patient loyalty.

### 3.2 SAMPLING STRATEGY

This study was conducted at Sakinah Hospital in East Java, using purposive sampling, involving 165 patients aged 18 years and older who had been hospitalized for at least one night. The sample size was determined based on the number of indicators used in the study, which is 32 indicators. According to (Ferdinand, 2014), the ideal sample size in Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis should be at least 5 to 10 times the number of indicators. Therefore, a sample size of 165 meets the minimum requirement suggested by Ferdinand to produce valid and reliable estimations. The use of PLS-SEM is also appropriate for moderate sample sizes as this method allows for flexible testing, even with a relatively smaller sample (Sarstedt, Ringle, and Hair, 2021). Additionally, focusing on a single hospital allows for an in-depth exploration of the relationships between healthcare service quality, hospital reputation and brand, patient experience, and patient loyalty, without institutional variability. In future, this research is planned to be expanded to multiple hospitals to strengthen the generalizability of the findings.

### 3.3 DATA COLLECTION

Data collection took place between August and October 2023 using a Likert-scale questionnaire to capture patient perceptions of healthcare service quality, hospital reputation and brand, patient experience, and control variables (gender, education level, health insurance type). The main challenges faced included patient accessibility, where health conditions, time limitations, and personal preferences affected participation. These challenges were addressed through a sensitive approach, adhering to ethical procedures, and obtaining hospital approval.

Another challenge was the variation in patient understanding of the questionnaire items, which was addressed by conducting a pilot test to ensure clarity of the questions and providing additional explanations when necessary. The time constraints patients had while at the hospital were also a limitation, so the questionnaire format was designed to be more concise and efficient. Through flexible steps and careful planning, valid and representative data was successfully collected despite these challenges.

### 3.4. DATA ANALYSIS TECHNIQUES

Data analysis for this study was performed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The selection of Partial Least Squares (PLS) as the analysis method was based on its suitability for the objectives and characteristics of the data. PLS is effective for analyzing data with a limited sample size, complex models, and non-normal data distributions (Hair et al., 2019). This method can also handle multicollinearity and measure latent variables, such as patient experience, which cannot be directly observed.

PLS allows for exploring causal relationships and mediation within a structural model, such as the impact of healthcare service quality and hospital reputation and brand on patient experience and patient loyalty. This method also supports research focus on prediction and understanding the relationships between variables in the context of complex data and limited resources (Wu, Chen, and Wang, 2023). PLS-SEM was implemented using SmartPLS software, which consists of two main stages. First, in the Measurement Model Evaluation stage, validity and reliability of the instruments were tested using convergent validity, measured by Average Variance Extracted (AVE), where AVE values greater than 0.5 indicate that constructs can capture more than half of the variance of their indicators. Discriminant validity was then tested using the Fornell-Larcker Criterion and Heterotrait-Monotrait Ratio (HTMT), where HTMT values lower than 0.85 indicate good discrimination between constructs. Internal consistency of the instruments was also measured using Composite Reliability and Cronbach's Alpha, with target values above 0.7 to ensure consistency and reliability.

The second stage is Hypothesis Testing, which evaluates the relationships between latent variables in the structural model. Path coefficients are used to determine the strength and direction of relationships between latent variables, while significance testing is

performed using bootstrapping with 5,000 resamples. T-values greater than 1.96 at a 95% confidence level indicate statistical significance. The resulting regression model is then used to test the research hypotheses through the following two main equations:

Patient Loyalty (PL) Equation

$$(1) \quad PL = b_1 \cdot HS + b_2 \cdot HB + b_3 \cdot PE + b_4 \cdot GEN + b_5 \cdot EDUC + b_6 \cdot TYPH$$

Patient Experience (PE) Equation

$$(2) \quad PE = b_1 \cdot HS + b_2 \cdot HB + b_3 \cdot GEN + b_4 \cdot EDUC + b_5 \cdot TYPH$$

Where:

PL: Patient Loyalty

PE: Patient Experience

HS: Healthcare Service Quality

HB: Hospital Reputation and Brand

Control variables: GEN: Gender, EDUC: Education Level, TYPH: Type of Health Insurance

Additionally, the Coefficient of Determination ( $R^2$ ) is used to measure the predictive power of the model, with values approaching 1 indicating higher prediction accuracy. Predictive Relevance ( $Q^2$ ) is measured using Stone-Geisser's test to assess the model's predictive ability on data outside the sample, while Effect Size ( $f^2$ ) measures the contribution of each variable to the dependent variables in the model, providing insight into the relative influence of each variable. The use of these three metrics provides a comprehensive foundation to assess the extent to which the model can explain and predict the relationships among the variables studied, as well as the model's validity in a broader context.

## 4. FINDINGS

### 4.1 BACKGROUND SOCIO-DEMOGRAPHIC STATISTICS

Table 1 presents the demographic characteristics of respondents. The sample consisted of around 51.3% men with an average age of respondents above 53 years, and the age group 32 to 52 years formed the highest proportion of respondents. The majority of respondents have an educational level of highest secondary, 37.5%, and doctorate, only 2.5% of the total respondents. The average visit to a health

facility is around two times. The majority of respondents had insurance under the National Health Insurance scheme.

TABLE 1  
Respondent Characteristics

Information		N	%
Gender	Man	85	51.3
	Woman	80	48.7
		165	100
Age	17-34	47	28.8
	35-52	56	33.7
	53>	62	37.5
		165	100
Education	Primary	38	23.2
	Secondary	62	37.5
	Bachelor	29	17.5
	Masters	15	8.8
	Doctorate	4	2.5
	Others	17	10.5
		165	100
Times of visits to the facility	Once	29	17.5
	Twice	109	66.3
	Three or more	27	16.2
		165	100
Type of Insurance	Government	159	96.5
	Private	6	3.5
		165	100

Source: Data processed

Based on Table 2, the results of the validity and reliability testing for the measurement model indicate that all variables meet the criteria for convergent validity and demonstrate high reliability. Loading factor values ( $\lambda$ )  $> 0.70$  and AVE  $> 0.50$  confirm convergent validity, while Cronbach's alpha ( $\alpha$ ) and composite reliability (CR)  $> 0.70$  indicate strong internal reliability. Patient loyalty shows the highest reliability ( $\alpha = 0.952$ ; CR = 0.960; AVE = 0.749), with frequency of visits as the strongest indicator ( $\lambda = 0.908$ ). Patient experience also exhibits high reliability ( $\alpha = 0.941$ ; CR = 0.951; AVE = 0.707), with post-treatment as the key indicator ( $\lambda = 0.887$ ). Healthcare service quality ( $\alpha = 0.930$ ; CR = 0.942; AVE = 0.671) is supported by availability of facilities ( $\lambda = 0.872$ ). Hospital reputation and brand ( $\alpha = 0.937$ ; CR = 0.948; AVE = 0.695)

highlights innovation and technology ( $\lambda = 0.879$ ). Control variables (GEN, EDUC, and TYPH) exhibit perfect measurement. The model is valid and reliable for further analysis, such as SEM.

#### 4.2 MEASUREMENT MODEL ASSESSMENTS

TABLE 2  
Measurement Model Testing Convergent Validity, Composite Reliability and Cronbach's Alpha

Variable	$\lambda$	Cronbach's $\alpha$	rho_A	CR	AVE
Patient loyalty		0.952	0.954	0.960	0.749
PL1: Willingness to return	0.856				
PL2: Recommendations to others	0.890				
PL3: Overall satisfaction	0.883				
PL4: Trust in service	0.832				
PL5: Conformity to expectations	0.838				
PL6: Frequency of visits	0.908				
PL7: Feeling valued	0.879				
PL8: Emotional loyalty	0.833				
Patient Experience		0.941	0.942	0.951	0.707
PE1: Ease of registration	0.786				
PE2: Waiting room comfort	0.827				
PE3: Staff friendliness	0.852				
PE4: Maintenance services	0.813				
PE5: Medical information	0.834				
PE6: Post-treatment	0.887				
PE7: Respect for privacy	0.860				
PE8: Accessibility	0.864				

TABLE 2 (continued)

Variable	$\lambda$	Cronbach's $\alpha$	rho_A	CR	AVE
Healthcare service quality		0.930	0.934	0.942	0.671
HS1: Patient safety	0.838				
HS2: Medical staff competency	0.841				
HS3: Availability of facilities	0.872				
HS4: Treatment effectiveness	0.738				
HS5: Cleanliness	0.809				
HS6: Response to emergencies	0.842				
HS7: Communication with patients	0.829				
HS8: Waiting time	0.778				
Hospital Reputation and Brand		0.937	0.939	0.948	0.695
HB1: Public trust	0.840				
HB2: Media reporting	0.783				
HB3: Patient testimonials	0.834				
HB4: Recognition and awards	0.842				
HB5: Branding and marketing	0.839				
HB6: Community involvement	0.839				
HB7: Innovation and technology	0.879				
HB8: Information transparency	0.810				
GEN	1.000	1.000	1.000	1.000	1.000
EDUC	1.000	1.000	1.000	1.000	1.000
TYPH	1.000	1.000	1.000	1.000	1.000

Source: Data processed

4.3 MEASUREMENT MODEL ASSESSMENTS

Based on Table 3, the results of the discriminant validity testing using the Fornell-Larcker Criterion, Heterotrait-Monotrait Ratio (HTMT), and Inner VIF Values analysis are presented. According to the Fornell-Larcker criterion, discriminant validity is achieved because the square root of the Average Variance Extracted (AVE) (diagonal values) for each construct is greater than the correlations with other constructs. For example, PL has an AVE square root of 0.865, which is greater than its correlations with PE (0.643) and HS (0.572). The HTMT results also support discriminant validity, as all values are below the threshold of 0.90, such as the relationship between PL and PE (0.676), as well as between HB and PE (0.596). Additionally, the analysis of Inner VIF Values shows no multicollinearity in the model, as all VIF values are below five, such as the relationship between PE and PL, with a VIF of 2.009. Therefore, the measurement model meets the criteria for discriminant validity and does not exhibit multicollinearity issues, making it suitable for further structural analysis.

TABLE 3  
Discriminant Validity

Variable	EDUC	GEN	HB	PE	PL	HS	TYPH
Fornell-Larcker Criterion							
EDUC	1.000						
GEN	0.254	1.000					
HB	0.258	0.082	0.834				
PE	0.416	0.252	0.562	0.841			
PL	0.468	0.178	0.522	0.643	0.865		
HS	0.309	0.111	0.320	0.518	0.572	0.819	
TYPH	0.294	0.209	0.018	0.126	0.244	0.239	1.000
Heterotrait-Monotrait Ratio (HTMT)							
EDUC							
GEN	0.254						
HB	0.266	0.086					
PE	0.429	0.261	0.596				
PL	0.478	0.179	0.550	0.676			
HS	0.317	0.114	0.339	0.547	0.604		
TYPH	0.294	0.209	0.037	0.130	0.250	0.246	
Inner VIF Values							
EDUC				1.264	1.336		
GEN				1.093	1.135		
HB				1.165	1.483		
PE					2.009		

TABLE 3 (continued)

Variable	EDUC	GEN	HB	PE	PL	HS	TYPH
PL							
HS				1.230	1.445		
TYPH				1.163	1.167		

Source: Data processed

#### 4.4 STRUCTURAL MODEL TESTING RESULTS

Testing of the Inner Model. Structural models focus on hypothesized relationships or paths between variables. The results of the inner model testing can be seen in Figure 2.

Based on Figure 2, the results of the path analysis using Partial Least Squares-based Structural Equation Modeling (SEM) show that HB and HS have a significant positive influence on PE. These factors contribute positively with path coefficients of 0.397 and 0.328, respectively. PE plays a strong mediating role between these two variables and PL, with a path coefficient of 0.502. This indicates that improvements in HS and HB can enhance PL through positive experiences gained. Additionally, control variables such as GEN, EDUC, and TYPH show very small effects on the latent variables, suggesting that the direct influence of these factors on PL and PE is insignificant in this model. This study highlights the critical role of PE in strengthening their PL, offering practical insights for hospital management to focus on improving healthcare service quality and hospital reputation and brand to strengthen patient relationships.

#### 4.5 HYPOTHESIS TESTING RESULTS

The results of the hypothesis testing presented in Table 4 indicate that PE and HS are the primary factors significantly influencing PL. HS has a direct impact on PL with a coefficient of  $b_1=0.273$  ( $p=0.000$ ), while PE contributes more significantly with a coefficient of  $b_3=0.292$  ( $p=0.001$ ). Additionally, HB also positively influences PL ( $b_2=0.222$ ,  $p=0.001$ ). On the other hand, control variables such as GEN ( $b_4=-0.009$ ,  $p=0.879$ ) and TYPH ( $b_6=0.086$ ,  $p=0.088$ ) do not have a significant effect on PL, while EDUC shows a significant positive effect ( $b_5=0.182$ ,  $p=0.006$ ). In shaping PE, HB has the largest impact ( $b_2=0.397$ ,  $p=0.000$ ), followed by HS ( $b_1=0.328$ ,  $p=0.000$ ). Control variables such as GEN ( $b_3=0.144$ ,  $p=0.009$ ) and EDUC ( $b_4=0.189$ ,  $p=0.006$ ) also significantly affect PE, while TYPH has no significant effect ( $b_5=-0.045$ ,  $p=0.424$ ).

The mediation analysis shows that PE mediates the relationship between HS and HB with PL. This mediation is significant for HS  $\rightarrow$  PE  $\rightarrow$  PL ( $p=0.006$ ) and HB  $\rightarrow$  PE  $\rightarrow$  PL ( $p=0.007$ ). Mediation for EDUC  $\rightarrow$  PE  $\rightarrow$  PL ( $p=0.057$ ) and TYPH  $\rightarrow$  PE  $\rightarrow$  PL ( $p=0.472$ ) is however not significant. Therefore, PE plays a crucial role in enhancing PL, particularly through the HS and HB, while control variables have a more limited impact. The equations for PL and PE are as follows:

Patient Loyalty Equation (PL):  $PL = 0.273 \cdot HS + 0.222 \cdot HB + 0.292 \cdot PE - 0.009 \cdot GEN + 0.182 \cdot EDUC + 0.086 \cdot TYPH$

Patient Experience Equation (PE):  $PE = 0.328 \cdot HS + 0.397 \cdot HB + 0.144 \cdot GEN + 0.189 \cdot EDUC - 0.045 \cdot TYPH$

Based on the results from these equations, PL is influenced by several key variables and controls. The equation for PL shows that PE has the greatest impact with a coefficient of 0.292, followed by HS at 0.273, and HB at 0.222. EDUC has a significant effect of 0.182, while GEN and TYPH are not significant, with coefficients of -0.009 and 0.086, respectively. In the PE equation, HB is the most significant factor with a coefficient of 0.397, followed by HS at 0.328. Additionally, GEN and EDUC have significant influences of 0.144 and 0.189, respectively, while TYPH has a small negative and insignificant effect (-0.045).

Overall, PE plays a pivotal role as a mediator in enhancing PL, especially through HS and HB. This underscores the importance for hospitals to strengthen their HB, HS, and PE in strategies to increase PL. Control variables such as EDUC have a positive effect on PL, while GEN and TYPH play a more limited role in this model.

Table 5 presents the outcomes for the Coefficient of Determination ( $R^2$ ) and Predictive Relevance ( $Q^2$ ) for PE and PL. For PE, the  $R^2$  value of 0.502 indicates that the model explains 50.2% of the variance in PE, suggesting a moderate explanatory power. The  $Q^2$  value of 0.462 reflects moderate predictive relevance, showing that the model can predict PE with a fair degree of accuracy. On the other hand, PL has an  $R^2$  of 0.565, meaning that 56.5% of the variance in PL is explained by the model, which indicates a better fit than for PE. The  $Q^2$  value for PL, at 0.482, further supports this by demonstrating a good level of predictive relevance, meaning the model is fairly effective at predicting PL. Overall, while both variables show a good degree of explanatory and predictive power, there is still room for improvement, suggesting the presence of other influencing factors not captured by the model.

FIGURE 2  
Structural Model

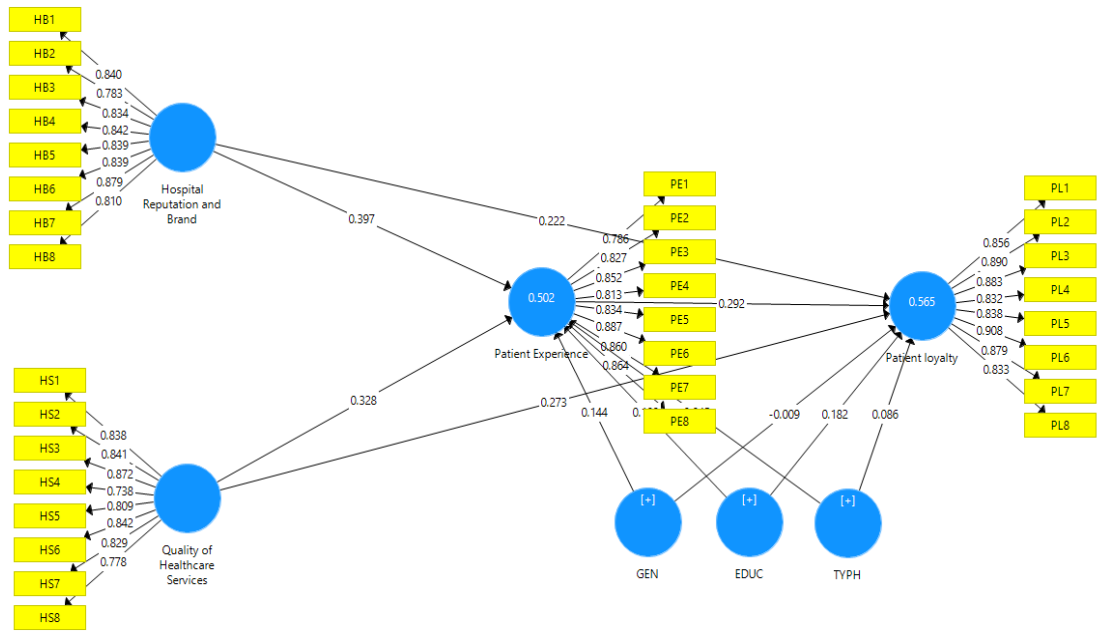


TABLE 4  
Hypothesis Testing

Variable	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ((O/STDEV))	P Values	Decision
Direct Effects						
H1: HS -> PE	0.328	0.331	0.065	5.028	0.000	Significant
H2: HB -> PE	0.397	0.389	0.066	6.063	0.000	Significant
H3: HS -> PL	0.273	0.268	0.071	3.868	0.000	Significant
H 4: HB -> PL	0.222	0.219	0.065	3.419	0.001	Significant
H5: PE -> PL	0.292	0.294	0.091	3.205	0.001	Significant
Ha1: GEN -> PE	0.144	0.144	0.055	2.628	0.009	Significant
Ha2: EDUC -> PE	0.189	0.195	0.068	2.771	0.006	Significant
Ha3: TYPH -> PE	-0.045	-0.047	0.056	0.800	0.424	Not Significant
Hb1: GEN -> PL	-0.009	-0.007	0.057	0.152	0.879	Not Significant
Hb2: EDUC -> PL	0.182	0.183	0.065	2.776	0.006	Significant
Hb3: TYPH -> PL	0.086	0.088	0.051	1.709	0.088	Not Significant
Indirect Effects (Mediating)						
Hc1: GEN -> PE -> PL	0.042	0.042	0.020	2.095	0.037	Significant
Hc2: EDUC -> PE -> PL	0.055	0.058	0.029	1.908	0.057	Not Significant
Hc3: TYPH -> PE -> PL	-0.013	-0.014	0.018	0.719	0.472	Not Significant
H 6: HS -> PE -> PL	0.096	0.097	0.035	2.739	0.006	Significant
H7: HB -> PE -> PL	0.116	0.115	0.043	2.687	0.007	Significant

Source: Data processed

**TABLE 5**  
Presents the Outcomes for Koefisien Determinasi ( $R^2$ ) and Relevansi Prediktif ( $Q^2$ )

Variabel	$R^2$	$Q^2$
PE	0.502	0.462
PL	0.565	0.482

Source: Data processed

The results from the f-square ( $f^2$ ) analysis in Table 6 show the extent to which each variable in the research model influences the others. Overall, HB has a very large effect on PE, with an  $f^2$  value of 0.272, indicating that HB plays a significant role in shaping the PE. On the other hand, PE has a moderate effect on PL, with an  $f^2$  value of 0.098, signifying that PE contributes significantly to PL. EDUC also shows a moderate effect on both PE and PL, with  $f^2$  values of 0.057 for each. In contrast, GEN and TYPH show very small effects, with an  $f^2$  of 0.000 for the effect of GEN on PL, and only 0.003 and 0.015 for the effects of TYPH on PE and PL, respectively. This suggests that these control variables have a limited impact on this model. Meanwhile, HS has a small to moderate effect on both PE and PL, with  $f^2$  values of 0.175 and 0.119, respectively.

Thus, it can be concluded that HB and HS have a greater influence compared to control variables such as GEN and TYPH.

**TABLE 6**  
Presents the Outcomes for f Square ( $f^2$ )

Variables	EDUC	GEN	HB	PE	PL	HS	TYPH
EDUC				0.057	0.057		
GEN				0.038	0.000		
HB				0.272	0.076		
PE					0.098		
PL							
HS				0.175	0.119		
TYPH				0.003	0.015		

Source: Data processed

## 5. DISCUSSION

The most significant finding in this study relates to the relationship between healthcare service quality and patient experience, which

reveals that healthcare quality has a direct and significant impact on patient experience. This finding suggests that the higher the healthcare service quality provided, the more positive the patient experience. Thus, patient experience can be effectively mediated by healthcare service quality, which plays a crucial role in enhancing patient loyalty through positive experiences. This contribution to the existing literature is important as it reinforces previous research highlighting the role of healthcare quality in shaping patient perceptions and satisfaction (Liu, Chen, and Ko, 2024; Darzi et al., 2023). In line with the Servqual theory and the SERVPERF model, which emphasize healthcare service quality as a key factor in patient satisfaction, this study strengthens the argument that healthcare quality plays a direct role in shaping patient experience (Parasuraman and Grewal, 2000). Additionally, the study contributes to the literature by emphasizing the importance of patient experience as a strong mediator in the relationship between healthcare quality and patient loyalty, supporting the relationship marketing theory that asserts positive customer experiences can enhance loyalty (Lolemo and Pandya, 2025).

This research provides practical insights for hospital administrators to enhance healthcare service quality as a strategy for boosting patient loyalty, especially in the highly competitive healthcare industry today. Improving doctor-patient interactions within the context of healthcare quality is emerging as essential (Darzi et al., 2023). The positive correlation between medical and financial aspects and patient experience underscores the significant role of hospitality in shaping overall patient satisfaction (Altinay et al., 2023). Patient satisfaction is a crucial metric for healthcare services, highlighting the profound impact of service quality in hospitals (Alibrandi et al., 2023). Furthermore, significant disparities exist in how patients perceive service quality (Wu, Ho, and Yang, 2024). Strategies aimed at improving revenue, such as enhancing patient experience and care quality, are essential (Scott et al., 2024). The quality of information provided significantly affects patient satisfaction and future consultation intentions (Chen, Jin, and Yan, 2024). Patients receiving high-quality care tend to report more positive hospital experiences, underscoring the critical role of patient experiences in shaping their perceptions of services received.

Hospitals today face intense competition due to open market policies, population growth, and increased health awareness. To build patient loyalty, hospitals must prioritize key aspects of

patient experience, including staff interactions, facility comfort, administrative efficiency, communication quality, and complaint management. Positive staff-patient interactions significantly enhance satisfaction and loyalty (Choi, Roh, and Lee, 2024), while clean, comfortable, and accessible facilities contribute to a better patient experience (Chen and Lin, 2015). Efficient processes and reduced wait times further strengthen satisfaction and loyalty (Askari et al., 2024). Clear communication about health conditions and treatments builds trust, while effective complaint handling maintains loyalty even after service failures (D'Souza et al., 2025).

A customer-oriented approach places patients at the center of hospital services by focusing on empathy, responsiveness, and personalized care (Cheng et al., 2022). Hospitals can enhance their reputation and brand by improving service quality, fostering community relations through health programs, and creating a comfortable environment (Gatwiri et al., 2022). These strategies not only increase satisfaction but also strengthen hospital loyalty and community trust. Leadership plays a vital role in embedding patient experience and care quality into hospital operations. Leaders must prioritize healthcare service quality, inspire empathy among staff, and facilitate cross-departmental collaboration (Anwar et al., 2025); (Quesada-Puga et al., 2024). Effective leadership ensures that quality care becomes integral to the hospital's strategic vision, enabling holistic improvements in healthcare services.

Improving service quality requires comprehensive efforts across medical and non-medical aspects, from reducing registration wait times to enhancing cleanliness and modernizing facilities (Milošević et al., 2025). Staff training in interpersonal and communication skills is equally critical. A culture of continuous feedback and patient-centered values helps sustain high standards of care and strengthens long-term patient relationships.

This study explores customer experience as a mediator between healthcare service quality and patient loyalty, focusing on issues such as long wait times, registration inefficiencies, and waiting room discomfort. While valuable insights are provided, several limitations exist. The cross-sectional design restricts analysis to a single time point, failing to capture dynamic relationships over time. Longitudinal studies are recommended for deeper exploration. The limited sample size may reduce the generalizability of findings, and future research should involve larger, more diverse populations. Although control variables such as gender, education level, and type of health insurance are

included, factors such as socio-economic status and cultural preferences remain unexplored despite their potential impact on patient experience and loyalty.

The geographic limitation to a single hospital in East Java may affect relevance to other regions with different healthcare characteristics. The use of perception-based measurement tools introduces risks of response bias or misinterpretation of questions. Self-reported data from questionnaires can also be influenced by social desirability bias. Addressing these issues in future research, such as expanding geographic coverage, using mixed-method approaches (e.g., interviews or observations), and employing longitudinal designs, will enhance the robustness and applicability of findings.

This study underscores the importance of customer experience, hospital reputation, and service quality in fostering patient loyalty while highlighting opportunities for future research to refine and expand these insights.

## 6. CONCLUSION

This study demonstrates that patient experience plays a key role in fostering patient loyalty. This is supported by the finding that healthcare service quality, hospital reputation, and brand are significant factors. A patient's level of education also has a positive impact on loyalty, while other control variables, such as gender and type of health insurance, have a more limited influence. Patient experience is an important mediator that strengthens the relationship between healthcare service quality, hospital reputation and brand, and patient loyalty. These findings emphasise the importance of focusing on patient experience in strategies aimed at improving services and patient satisfaction.

Hospitals are recommended to improve healthcare service quality by strengthening communication, accelerating service delivery and enhancing facility comfort. Hospital reputation management should also be reinforced through positive campaigns, active community engagement and strategic communication programmes. Patient experience could be improved by training staff to refine their interpersonal skills and empathy, and by adopting a feedback system that enables patients to provide input on the quality of healthcare services.

Future researchers are recommended to use a longitudinal design to understand changes in patient loyalty over time and to

expand the research scope to include multiple hospitals to enhance the generalisability of the results. Future research should also explore additional factors, such as socio-economic status and cultural preferences, and utilise more diverse data collection methods, such as interviews or direct observation. Technological innovations, such as telemedicine, could also be a relevant area of research in order to understand their impact on patient experience and loyalty.

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### REFERENCE

- Ahmed, I., A. Al Masud, M.A. Hossain, M.A. Hossain, and M. Kim. "Understanding Customer Switching Behavior: An Empirical Examination of Mobile Financial Services." *Social Sciences and Humanities Open* 11 (2025): 101270.
- Akthar, N., S. Nayak, and Y. Pai. "Determinants of Patient Satisfaction in Asia: Evidence from Systematic Review of Literature." *Clinical Epidemiology and Global Health* 23 (2023): 101393.
- Alibrandi, A., L. Gitto, M. Limosani, and P.F. Mustica. "Patient Satisfaction and Quality of Hospital Care." *Evaluation and Program Planning* 97 (2023): 102251.
- Alshiha, A.A. "Quarantine Hotels: Integration between Hospitality and Healthcare Services to Promote Health Behavior and Quality of Life." *American Journal of Health Behavior* 45, no. 6 (2021): 1059–078.
- Altinay, L., Z. Alrawadieh, F. Tulucu, and H.E. Arici. "The Effect of Hospitableness on Positive Emotions, Experience, and Well-Being of Hospital Patients." *International Journal of Hospitality Management* 110 (2023): 103431.
- Anwar, K., T. Sulistyowati, P. Pardosi, A. Frimayasa, N. Fitria, "Program Studi, Doktor Ilmu, Universitas Dian, and Nusantara Jakarta." *Indonesia Journal of Engineering and Education Technology (IJEET)* (2025): 8–19.
- Askari, S., M. Javadinasr, F. Peiravian, N.A. Khan, J. Auld, and A.K. Mohammadian. "Loyalty toward Shared E-Scooter: Exploring

- the Role of Service Quality, Satisfaction, and Environmental Consciousness.” *Travel Behaviour and Society* 37 (2024): 100856.
- Chen, Q., J. Jin, and X. Yan. “Impact of Online Physician Service Quality on Patients’ Adoption Behavior across Different Stages: An Elaboration Likelihood Perspective.” *Decision Support System* 176 (2024): 114048.
- Chen, S.C., and C.P. Lin. “The Impact of Customer Experience and Perceived Value on Sustainable Social Relationship in Blogs: An Empirical Study.” *Technological Forecasting and Social Change* 96 (2015): 40–50.
- Cheng, D., K. Liu, Z. Qian, Z. Chen, and H. Mao. “Study on Survival and Sustainable Development of Small- and Medium-Sized Tourism and Hospitality Enterprises in Macao Based on Regional Soft Environment and Competitive Advantage.” *Frontiers in Psychology* 12 (January) (2022): 1–15.
- Choi, J., T. Roh, and J.H. Lee. “The Pitfalls of Corporate Social Irresponsibility: Hypocrisy of Family Firms in South Korea.” *Journal of Cleaner Production* 435 (January) (2024): 140557.
- Creswell, J., Codlin, A. J., Andre, E., Micek, M. A., Bedru, A., Carter, E. J., ... & Ditiu, L. “Results from Early Programmatic Implementation of Xpert MTB/RIF Testing in Nine Countries.” *BMC Infectious Diseases* 14, no. 1 (2014): 1-12.
- D’Souza, C., M. Nanere, M. Marimuthu, M. Arwani, D. Nguyen, and N. Nguyen. “Sustainability Leverage, Customer Orientation and Firm Performance—An Empirical Study of Small Medium Enterprises in Indonesia.” *Sustainable Development* 33, no. 5 (2025): 6639-658.
- Darzi, M.A., S.B. Islam, S.O. Khursheed, and S.A. Bhat. “Service Quality in the Healthcare Sector: A Systematic Review and Meta-Analysis.” *LBS Journal of Management & Research* 21, no. 1 (2023): 13–29.
- Dewi, F.H., Y.W. Handranata, and M.G. Herlina. “The Effect of Service Quality and Customer Satisfaction toward Customer Loyalty in Service Industry.” *Uncertain Supply Chain Management* 9, no. 3 (2021): 631–36.
- Ferdinand, Augusty. *Metode Penelitian Manajemen: Pedoman Penelitian Untuk Penulisan Skripsi Tesis Dan Desrtasi Ilmu Manajemen* (Edisi 5). Indonesia: Universitas Dipenogoro Press, 2014.
- Gomm, Roger. “Social Research Methodology.” *Social Research Methodology*. Bloomsbury Publishing, 2008.

- Gül, İ., E.T. Helvacıoğlu, and S. Saraçlı. "Service Quality, Outpatient Satisfaction and Loyalty in Community Pharmacies in Turkey: A Structural Equation Modeling Approach." *Exploratory Research in Clinical and Social Pharmacy* 12 (July) (2023): 100361.
- Hair, J.F., Black, William C., Babin, Barry J., and Anderson, R. E. *Multivariate data analysis* (Illus.; 8th ed.). Cengage, 2019.
- Hazimah, Z., and E. Azis. "Pengaruh Program Bimbingan Karir Skill Academy sebagai Tanggung Jawab Sosial Perusahaan terhadap Citra Perusahaan Ruangguru." *Program Studi Manajemen Bisnis Telekomunikasi dan Informatika, Universitas Telkom. SEIKO: Journal of Management & Business* 5, no. 2 (2022): 289–305.
- Hunter-Jones, P., L. Sudbury-Riley, A. Al-Abdin, L. Menzies, and K. Neary. "When a Child Is Sick: The Role of Social Tourism in Palliative and End-of-Life Care." *Annals of Tourism Research* 83 (2020): 102900.
- Jiang, H., and Y. Zhang. "An Investigation of Service Quality, Customer Satisfaction and Loyalty in China's Airline Market." *Journal of Air Transport Management* 57: 80–8.
- Laver, Kate E., Zoe Adey-Wakeling, Maria Crotty, Natasha A. Lannin, Stacey George, and Catherine Sherrington. "Telerehabilitation Services for Stroke." *Cochrane Database of Systematic Reviews*. John Wiley & Amp; Sons, Ltd., 2020.
- Liu, G., Y. Chen, and W.W. Ko. "The Influence of Marketing Exploitation and Exploration on Business-to-Business Small and Medium-Sized Enterprises' Pioneering Orientation." *Industrial Marketing Management* 117 (2024): 131–47.
- Lolemo, S.E., and H.B. Pandya. "Customer E-Satisfaction as a Mediator between e-Service Quality, Brand Image, and e-Loyalty: Insights from Ethiopian Digital Banking Technology." *Journal of Digital Economy* 4 (2025): 1–15.
- Lubis, A., R. Dalimunthe, Y. Absah, and B.K. Fawzee. "The Effect of Corporate Communication and Service Quality on Customer Loyalty and Satisfaction in Sharia Banking." *Journal of Asian Finance, Economics and Business* 8, no. 3 (2021): 1267–74.
- Milošević, I., A. Stojanović, Đ. Nikolić, I. Mihajlović, A. Brkić, M. Perišić, and V. Spasojević-Brkić. "Occupational Health and Safety Performance in a Changing Mining Environment: Identification of Critical Factors." *Safety Science* 184 (2025): 106745
- Patmawati, D.A., and A.L. Andjarwati. "Peran Pengalaman

- Pelanggan Dalam Memediasi Pengaruh Kualitas Layanan, Citra Perusahaan, dan Harga Terhadap Loyalitas Pelanggan PT. Pos Indonesia.” *Jurnal Ilmu Manajemen* 11, no. 2 (2023): 323–36.
- Parasuraman, A., and D. Grewal. “The Impact of Technology on the Quality-Value-Loyalty Chain: A Research Agenda.” *Journal of the Academy of Marketing Science* 28, no. 1 (2000): 168–74.
- Purnama, C., Z.Z. Rahmah, D. Fatmah, M. Rahmah, S. Hasani, Y. Rahmah, Yuliani and B. Mutfarida. “Investigasi Peran Temporal Kualitas Pelayanan Terhadap Loyalitas Nasabah Dengan Kepuasan Sebagai Variabel Mediasi Pada Bank Syariah Indonesia.” *Manajemen: Jurnal Ekonomi* 6, no. 2 (2024): 390–400.
- Quesada-Puga, C., F.J. Izquierdo-Espin, M.J. Membrive-Jiménez, R. Aguayo-Estremera, G.A. Cañadas-De La Fuente, José Luis Romero-Béjar, and José Luis Gómez-Urquiza. “Job Satisfaction and Burnout Syndrome among Intensive-Care Unit Nurses: A Systematic Review and Meta-Analysis.” *Intensive and Critical Care Nursing* 82 (2024): 1–10.
- Sadiartha, A.A.N.G, and G.A.M. Apsari. “Role of Satisfaction in Mediating the Effect of Services Quality on the Customers’ Loyalty in the Village Credit Institutions of Pekraman, Indonesia.” *Journal of Business and Social Review in Emerging Economies* 4, no. 2 (2018): 147–62.
- Sarstedt, Marko, Christian M Ringle, and Joseph F Hair. 2021. “Partial Least Squares Structural Equation Modeling.” In *Handbook of Market Research*, 587–632. Springer.
- Scott, A., T. Taylor, G. Russell, and M. Sutton. “Associations between Corporate Ownership of Primary Care Providers and Doctor Wellbeing, Workload, Access, Organizational Efficiency, and Service Quality.” *Health Policy* 142 (2024): 105028.
- Singh, V., M.P. Sharma, K. Jayapriya, B.K. Kumar, Mr A Raj, N. Chander, and B.R. Kumar. “Service Quality, Customer Satisfaction, and Customer Loyalty: A Comprehensive Literature Review.” *Journal of Survey in Fisheries Sciences* 10 (4S): 3457–64.
- Suess, C., and M. Mody. “Hospitality Healthscapes: A Conjoint Analysis Approach to Understanding Patient Responses to Hotel-like Hospital Rooms.” *International Journal of Hospitality Management* 61 (2017): 59–72.
- Tasci, A.D.A., and K.J. Semrad. “Developing a Scale of Hospitableness: A Tale of Two Worlds.” *International Journal*

*of Hospitality Management* 53 (2016): 30–41.

- Wu, C.C., C.C. Chen Ho, and K.C. Yang. “Selecting Indicators of Acupuncture Service Quality Using Analytic Hierarchy Process.” *European Journal of Integrative Medicine* 66 (2024): 102324.
- Wu, C.M, T.J. Chen, and Y.C. Wang. “Journal of Hospitality and Tourism Management Formation of Hotel Employees ’ Service Innovation Performance : Mechanism of Thriving at Work and Change-Oriented Organizational Citizenship Behavior.” *Journal of Hospitality and Tourism Management* 54 (2023): 178–87.



## **THE MODERATION EFFECTS OF TASK COMPLEXITY ON PROFESSIONAL SKEPTICISM, INTER-AGENCY COOPERATION, AND TAX AUDITORS' PERFORMANCE RELATIONSHIP**

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### **ABSTRACT**

This study examines the influences of professional skepticism and inter-agency cooperation on tax auditors' performance based on the attribution theory. Using expectancy theory, the research further explores the moderating effects of task complexity on the relationship between professional skepticism, inter-agency cooperation, and tax auditors' performance. A quantitative approach was adopted, employing survey questionnaires distributed to tax auditors from the Inland Revenue Board of Malaysia (IRBM) and the Royal Malaysian Customs Department (RMCD). The data underwent analysis using IBM-SPSS-AMOS version 21 for Structural Equation Modelling (SEM) statistical analysis. The results reveal that both professional skepticism and inter-agency cooperation impact on tax auditors' performance. Moreover, task complexity was found to moderate the relationships between professional skepticism, inter-agency cooperation, and tax auditors' performance. It is important to note that this study focused solely on the influence of professional skepticism, inter-agency cooperation, and task complexity on tax auditors' performance, without testing other internal and external factors. This study contributes to theoretical implications in the field of taxation, particularly within tax auditing, by offering empirical evidence on the effects of internal and external factors on tax auditors' performance, along with the moderating influence of task complexity. The findings provide valuable insights for the IRBM and RMCD, emphasizing the significance of professional skepticism, inter-agency cooperation, and task complexity in enhancing tax auditors' performance. Notably, the uniqueness of this study lies in the researchers' exploration of the synergy between direct and indirect taxes to deepen the understanding of factors affecting tax auditors' performance.

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## 1. INTRODUCTION

Auditors' performance is crucial in determining the accuracy and reliability of audit assessments and compliance enforcement. Performance is considered a fundamental element for an auditor and is commonly used to assess the accuracy of auditors in carrying out audit activities. The success of auditing depends on auditors' performance. Auditors are expected to perform well and execute their duties following standard auditing procedures. The quality of auditors' performance is evaluated based on the audit's quantity and quality and the audit's completion time (Ahmad et al., 2019; Sunyoto, Ghozali, and Purwanto, 2017). However, not all auditors are capable of performing their duties adequately, leading to significant concern in the auditing field, especially regarding poor auditors' performance. This issue has been present since the 1970s (Kusumastuti, Ghozali, and Fuad, 2016).

According to Wistawan and Damayanti (2019), performance is one of the individual achievements usually associated with attitudes or behavior in carrying out work for better performance. Based on the attribution theory developed by Fritz Heider in 1958, it is argued that internal and external factors influence a person's attitudes or behavior. Internal factors are within an individual's control, while external factors are beyond their control. Additionally, the literature emphasizes the importance of auditors' behavior and attributes in conducting audit tasks and standard auditing procedures that can impact auditors' performance (Sulaiman, Shahimi, and Singh, 2019; Hussein and Hanefah, 2013).

Most previous studies on auditors' performance focus on financial audits, internal audits, and external audits, yielding inconsistent results (Falola, Tams-alasia, and Udochukwu, 2018; Sanusi et al., 2018; Sunyoto et al., 2017; Kusumastuti et al., 2016; Alissa et al., 2014). Studies focusing on tax auditors' performance, however, are limited. Although similar studies have been conducted in the Malaysian context, they mainly focus on tax auditors from the Inland Revenue Board of Malaysia (IRBM) handling direct taxes (Rashid et al., 2018; Zandi and Elwahi, 2016; Muhammad, 2013).

Therefore, the current study focuses on direct and indirect taxes from the IRBM and Royal Malaysian Customs Department (RMCD) to better understand and perspective on tax auditors' performance and provide empirical evidence using Structural Equation Modeling (SEM) analysis. Additionally, this study aims at investigating the impact of professional skepticism (internal factors) and inter-agency cooperation (external factors) on tax auditors' performance based on the attribution theory in the context of tax auditing. Furthermore, based on expectancy theory, this study explores the moderating effects of task complexity on the relationship between professional skepticism, inter-agency cooperation, and tax auditors' performance.

This study offers theoretical implications by contributing to the body of knowledge in the area of taxation and tax audits using attribution and expectancy theory. Moreover, this study provides valuable practical insights into the significance of professional skepticism, inter-agency cooperation, and the moderating role of task complexity on tax auditors' performance.

## 2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

### 2.1 TAX AUDITORS' PERFORMANCE

Tax auditors are expected to conduct audits in accordance with the objective of tax audits, which is to review taxpayers' business records and financial affairs to ensure that the correct amount of income is reported and the correct amount of tax is calculated and paid in compliance with tax laws and regulations. Ratnawati (2020) underscores the key characteristics of tax auditors who are dedicated, competent, and professional in carrying out their audit duties, leading to a high level of auditor performance. Within the realm of tax audits, proficient tax auditors can successfully finalize audit tasks within the allocated time and deliver high-quality audit reports, thus fulfilling the objectives of tax audits and achieving optimal performance.

Previous research has indicated that the factors influencing auditors' performance can be analyzed through attribution theory, which is grounded in two perspectives encompassing internal and external factors. Attribution theory posits that an individual's conduct is shaped by internal and external factors (Heider, 1958). Consistent with attribution theory, this study delves into the impact of professional skepticism (internal factor) and inter-agency cooperation (external factor) on tax auditors' performance.

## 2.2 PROFESSIONAL SKEPTICISM

Attribution theory explains that the ability of tax auditors to carry out audit tasks is determined by internal factors such as professional skepticism and their behavior towards the completion of tax audits. Professional skepticism refers to the attitudes of questioning minds and critical assessment in ensuring the adequacy and relevance of information and audit evidence (Wahidahwati and Asyik, 2022).

Auditors are responsible for maintaining the appropriate professional skepticism in auditing activities to reduce potential risks and as a basis for auditing standards that may impact auditors' performance (Chen, Wang, and Liu, 2023). Auditors who demonstrate high professional skepticism increase their ability to detect and gather additional audit evidence in tax audit activities (Fullerton and Durtschi, 2011).

Past studies have found that professional skepticism influences auditors' performance (Hussin et al., 2017; Hurtt et al., 2013; Rose, 2007). Hussin et al. (2017) emphasize the importance of professional skepticism in tax audit activities to investigate audit evidence, ensuring that the information is sufficient for audit judgment and decision-making processes to accomplish tasks. In contrast, Peytcheva (2014) disclosed that professional skepticism does not influence auditors' performance. However, auditing standard practices require appropriate professional skepticism, which leads to better performance. Auditors with high professional skepticism would likely collect more audit evidence to produce a high-quality audit report. Therefore, based on the literature, the following hypothesis is developed:

H1: Professional skepticism positively influences tax auditors' performance.

## 2.3 INTER-AGENCY COOPERATION

Attribution theory explains that the tax auditors' capacity to perform audit tasks is influenced by external factors beyond one's control. In this context, inter-agency cooperation is an external factor impacting tax auditors' performance. Inter-agency cooperation pertains to collaboration among agencies, organizations, or entities to achieve common objectives and streamline processes in related fields (Curnin and Owen, 2013; Ervin, 2004; Sullivan and Skelcher, 2003). For instance, inter-agency cooperation occurs between IRBM, RMCD,

financial institutions, the Companies Commission of Malaysia, and other pertinent agencies. Generally, inter-agency cooperation in tax audit activities includes sharing and exchanging data and information and participating in joint audit activities. Each agency possesses different data and information that are beneficial to others in the tax auditing process. Moreover, inter-agency cooperation facilitates the exchange of knowledge and expertise among involved parties. This enables the transfer of audit techniques, methods, and systems, especially among tax authorities in Malaysia (IRBM and RMCD), thereby enhancing tax auditors' capabilities in conducting audits.

Recognizing the significance of inter-agency cooperation in financial and tax contexts, the OECD (2017) advocates fostering such collaboration to address tax non-compliance issues such as tax avoidance and evasion. Addressing tax non-compliance is crucial in the context of tax audits. Owens et al. (2017) emphasized the importance of inter-agency cooperation in enhancing the effectiveness and efficiency of the investigation process, particularly in taxation and financial sectors. The topic of inter-agency cooperation has been extensively discussed, especially in complex policies (Costumato, 2021). Studies focusing on inter-agency cooperation and its impact on tax auditors' performance, however, are limited. Therefore, this study aims at examining the concept of inter-agency cooperation, specifically exploring its influence on tax auditors' performance. Consequently, the following hypothesis has been formulated:

H2: Inter-agency cooperation positively influences tax auditors' performance.

## 2.4 TASK COMPLEXITY

Expectancy theory explains that task complexity can moderate the relationship between effort and performance (Ferris, Beehr, and Gilmore, 1978). In this study, in line with expectancy theory, effort refers to professional skepticism and inter-agency cooperation. Therefore, according to expectancy theory, task complexity will moderate the relationship between professional skepticism, inter-agency cooperation, and tax auditors' performance.

Audits are considered complex tasks due to the difficulty and variability involved (Asmara, 2019). For example, the increasing regulations and rapid technological changes contribute to the complexity of tasks. Bratten et al. (2013) indicated that task

complexity can influence the application of professional skepticism among auditors in auditing activities, especially in highly complex audit tasks. Hence, the level of complexity (low or high) will moderate the relationship between professional skepticism and tax auditors' performance by either strengthening or weakening it. When tasks are highly complex, they might weaken the relationship, whereas a low level of complexity can strengthen it. The expectancy theory proposed by Victor Vroom, explains that the moderation effects of task complexity on the relationship between professional skepticism and tax auditors' performance are based on three important elements, namely (1) Expectancy, (2) Instrumentality, and (3) Valence. Therefore, the following hypothesis was developed:

H3: Task complexity moderates the relationship between professional skepticism and tax auditors' performance.

Furthermore, studies by Klijn et al. (2016) and Yang and Hsieh (2007) have shown that task complexity moderates the relationship between inter-agency cooperation and performance. This implies that in the context of the study, task complexity significantly impacts inter-agency cooperation in tax auditing (Lundin, 2007). According to the expectancy theory, the relationship between inter-agency cooperation and tax auditors' performance can be moderated by task complexity. The theory suggests that individuals' behavior depends on the three key elements in expectancy theory, namely expectancy (effort-performance relationship), instrumentality (performance-outcome relationship), and valence (value of outcomes). These three elements explain how the relationship between inter-agency cooperation and tax auditors' performance can be moderated by task complexity by either strengthening or weakening the aforementioned relationship.

H4: Task complexity moderates the relationship between inter-agency cooperation and tax auditors' performance.

### 3. RESEARCH FRAMEWORK

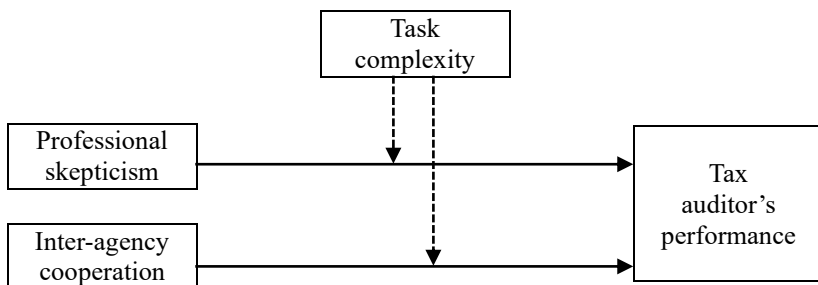
This study employed attribution theory as the theoretical framework. Attribution theory is a behavioral theory that effectively explains the performance of tax auditors. According to the theory, individuals' behavior is influenced by both internal and external factors (Solichin et al., 2021; Widyakusuma, Sudarma, and Roekhudin, 2019; Heider,

1958). In this study, professional skepticism is considered an internal factor, while inter-agency cooperation is seen as an external factor that impacts tax auditors' behavior and performance. As an internal factor, professional skepticism plays a crucial role in influencing tax auditors' behavior for improved performance (Solichin et al., 2021). High professional skepticism encourages tax auditors to critically evaluate and ensure the accuracy of audit evidence (Nazri, Rasib, and Zolkifli, 2019). Furthermore, inter-agency cooperation, as an external factor, enhances the completeness and success of the tax auditing process.

Moreover, this study was also guided by expectancy theory. Expectancy theory, another behavioral theory, explains performance (Muindi and Obonyo, 2015). According to this theory, task complexity moderates the relationship between professional skepticism and inter-agency cooperation concerning tax auditors' performance. The expectancy theory elaborates on how task complexity influences the relationship between professional skepticism and tax auditors' performance based on three key elements: expectancy (effort-performance), instrumentality (performance-outcome), and valence (value of outcomes). Furthermore, the moderation effects of task complexity are elaborated based on the level of complexity (low and high levels) that can either strengthen or weaken the relationship between professional skepticism and tax auditors' performance.

The research framework in Figure 1 was developed based on the discussions presented in the literature review and the theoretical foundations (attribution theory and expectancy theory) relevant to this study.

FIGURE 1  
Research Framework



## 4. RESEARCH METHODOLOGY

### 4.1 RESEARCH DESIGN

This study employed positivist quantitative measurement and statistical analysis principles suitable for achieving the study's objectives. Quantitative research designs are commonly associated with positivism, especially when utilizing predetermined and highly structured methods for data collection (Saunders, Lewis, and Thornhill, 2019). The quantitative research design aligns with the research objective and mainly focuses on statistical analysis (Queirós, Daniel, and Almeida, 2017).

### 4.2 POPULATION AND SAMPLE

The population for this study consists of tax auditors from the Inland Revenue Board of Malaysia (IRBM) and the Royal Malaysian Customs Department (RMCD) who have a minimum of one year of experience in tax audits and hold executive levels and above.

This study employed a web-based online calculator to determine the sample size (Raosoft, 2004). The web-based online calculator recommended a minimum of 325 tax auditors, which is deemed a large sample size suitable for SEM analysis (Awang et al., 2023; Hair et al., 2018).

### 4.3 RESEARCH INSTRUMENTS AND MEASUREMENTS

The research instruments developed were adapted and modified from previous studies to suit the current study, as presented in Table 1. These instruments were validated during the pre-testing stages by academicians and practitioners, such as tax auditors at the managerial level, and were approved by the Ethics Committee for Research Involving Human Subjects at Universiti Putra Malaysia before commencing data collection.

The survey questionnaires comprised five sections: A. Demographic and general section, B. Internal factor, C. External factor, D. Moderating effects, and E. Tax auditors' performance. The research instrument measurements utilized a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

TABLE 1  
Research Instruments

Variables	Sources
Professional Skepticism (PS <sub>1</sub> )	Hurtt (2010); Hussin et al. (2017)
Inter-agency Cooperation (IAC <sub>1</sub> )	Alzeban and Gwilliam (2014); Linda et al. (2014); Ramesh, Sulaiman, and Zakaria (2021); Susan (2019)
Task Complexity (TC <sub>1</sub> )	Douglas and Milton (1997); Hamza (2020)
Tax Auditors' Performance (TAP <sub>1</sub> )	Linda et al. (2014); Pedro et al. (2019)

#### 4.4 DATA COLLECTION AND DATA ANALYSIS

This study utilized a survey strategy commonly employed in quantitative research, employing online survey questionnaires created using Google Forms for data collection processes (Sekaran, 2003). The online survey questionnaires were disseminated to tax auditors in the Inland Revenue Board of Malaysia (IRBM) and the Royal Malaysian Customs Department (RMCD) through the heads and coordinators of the respective tax audit departments. Several follow-ups were conducted with the heads and coordinators to achieve the minimum sample size of 325. In total, 378 responses to the online survey questionnaires were received. However, only 370 responses met the criteria for validity and were included in the study, meeting the required minimum sample size.

The quantitative data analysis process employed Structural Equation Modelling (SEM) using IBM-SPSS-AMOS software version 21. The SEM statistical analysis encompassed confirmatory factor analysis (CFA), the measurement model, the structural model, and moderation testing.

## 5. RESULTS AND DISCUSSION

### 5.1 CONFIRMATORY FACTOR ANALYSIS

CFA involves unidimensionality, model fit, convergent validity, and construct reliability (Awang et al., 2023; Sarwar et al., 2022; Bahkia et al., 2019). The CFA procedures are considered successful when the

unidimensionality is achieved with factor loading values of all items above 0.60, and the model fits within the acceptable range of fitness indices categories, meeting the criteria for absolute fit, incremental fit, and parsimonious fit (Awang et al., 2023; Hair et al., 2018). The final steps in CFA involve ensuring convergent validity with an Average Variance Extracted (AVE) value above 0.50 and a Composite Reliability (CR) value above 0.60.

Initially, the model consisted of 27 items: professional skepticism (six items: PS\_1 to PS\_6), inter-agency cooperation (nine items: IAC\_1 to IAC\_9), and tax auditors' performance (twelve items: TAP\_1 to TAP\_12). Four items were excluded from the model due to low factor loadings of less than 0.60 (PS\_1: 0.386, PS\_2: 0.300, PS\_6: 0.439, and TAP\_4: 0.562) during the CFA processes.

These items were removed to improve the model fit in accordance with the CFA criteria (Awang et al., 2023; Collier, 2020; Hair et al., 2018; Kline, R.B., 2016). Additionally, the CFA was utilized to assess the Average Variance Extracted (AVE) and Composite Reliability (CR) (Thottoli and Ahmed, 2023). Removing items with low factor loadings contributes to achieving favorable values for AVE and CR, thereby enhancing the model (Rehman, Bano, and Bhatti, 2019). The remaining twenty-four items, comprising professional skepticism (items PS\_3 to PS\_5), inter-agency cooperation (items IAC\_1 to IAC\_9), and tax auditors' performance (items TAP\_1 to TAP\_3 and TAP\_5 to TAP\_12), were retained in the model for further steps in SEM.

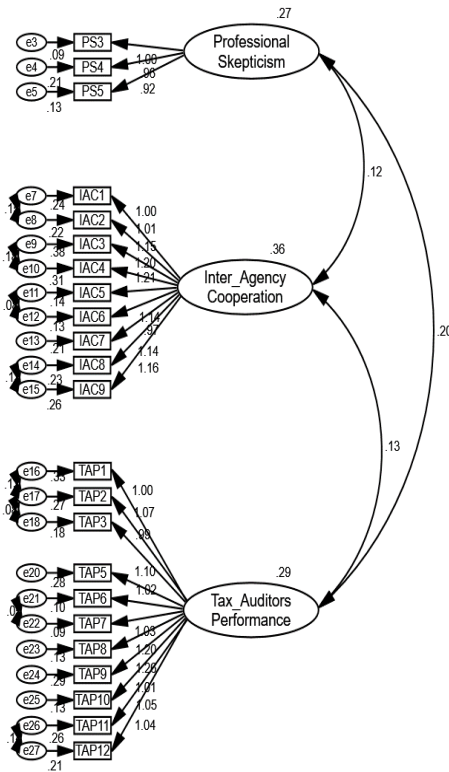
Subsequently, a Modification Index (MI) value exceeding 15.00 indicates redundancy (Yusof et al., 2017). Redundant items were then correlated with a double-headed arrow, for example,  $e_8 \leftrightarrow e_7$ . The modification process was iterated until the fitness indexes reached acceptable values. The CFA model post unidimensionality and MI process is depicted in Figure 2.

### 5.1.1 CONSTRUCT VALIDITY

The construct validity was assessed using the fitness indexes based on three categories: absolute fit, incremental fit, and parsimonious fit. In the absolute fit category, the RMSEA was 0.073, which is less than 0.08 and thus accepted. In the incremental fit category, AGFI was 0.827, less than 0.90 (not accepted), while CFI was 0.946, greater than 0.90 (accepted), NFI was 0.921, greater than 0.90 (accepted), and TLI was 0.938, greater than 0.90 (accepted). In the parsimonious fit

category, ChiSq/df was 2.955, less than 3.0, and accepted. For incremental fit, at least one of the criteria (AGFI, CFI, NFI, TLI) must be greater than 0.90 and accepted (Awang et al., 2023; Collier, 2020; Hair et al., 2018; Kline, R.B., 2016). Thus, the construct validity criteria for the CFA model are met when fulfilling all three categories in fitness indexes: (1) RMSEA = 0.073, (2) CFI = 0.946, NFI = 0.921, TLI = 0.938, and (3) ChiSq/df = 2.955.

FIGURE 2  
Confirmatory Factor Analysis



Chi-Square=647.153; p value (>.05)=.000  
 DF=219  
 Relative Chi-Sq (<5.0)=2.955  
 GFI (>=.9) =.862  
 AGFI (>=.9) =.827  
 CFI (>=.9) =.946  
 IFI (>=.9) =.946  
 NFI (>=.9) =.921  
 TLI (>=.9) =.938  
 RMSEA (<=.08) =.073  
 AIC (lower better)=761.153  
 (Unstandardized estimates)

## 5.1.2 CONVERGENT VALIDITY

Convergent validity was assessed based on Average Variance Extracted (AVE) and Composite Reliability (CR). AVE and CR were assessed in the model to ensure the validity and reliability of the measurement items (Khairi et al., 2024). The minimum value of AVE is 0.50 (Awang et al., 2023; Collier, 2020; Mahfouz et al., 2020). Meanwhile, the minimum value of CR is 0.60 (Sarwar et al., 2022). The results in Table 2 show that all the constructs in the CFA model are greater than 0.50 for AVE and greater than 0.60 for CR. Thus, this study concludes that the CFA model has achieved convergent validity.

TABLE 2  
Convergent Validity and Composite Reliability

Constructs	Items	Factor Loadings	AVE	CR
Professional Skepticism (PS_)	PS_3	0.837	0.633	0.838
	PS_4	0.746		
	PS_5	0.801		
Inter-agency Cooperation (IAC_)	IAC_1	0.788	0.675	0.949
	IAC_2	0.800		
	IAC_3	0.762		
	IAC_4	0.806		
	IAC_5	0.917		
	IAC_6	0.909		
	IAC_7	0.769		
	IAC_8	0.814		
	IAC_9	0.812		
Tax Auditors' Performance (TAP_)	TAP_1	0.702	0.638	0.951
	TAP_2	0.756		
	TAP_3	0.794		
	TAP_5	0.741		
	TAP_6	0.887		
	TAP_7	0.891		
	TAP_8	0.857		
	TAP_9	0.770		
	TAP_10	0.824		
	TAP_11	0.752		
	TAP_12	0.790		

## 5.2 MEASUREMENT MODEL

Discriminant validity was assessed to confirm that the measurement model does not contain redundant items (Sabri et al., 2023). The Fornell and Larcker criterion, based on the Average Variance Extracted (AVE) and the square roots of AVE ( $r^2$ ), were utilized for this purpose. The square roots of AVE ( $r^2$ ) should surpass the AVE value for the correlations among constructs (Awang et al., 2023; Fornell and Larcker, 1981; Sabri et al., 2023). Specifically, the diagonal value should exceed the other values in its respective row and column. The findings presented in Table 3 demonstrate that discriminant validity was successfully established for all constructs within the measurement model. These results affirm that redundant items are not present in the measurement model.

TABLE 3  
Discriminant Validity

Construct	PS <sub>√</sub>	IAC <sub>√</sub>	TAP <sub>√</sub>
PS <sub>√</sub>	0.796		
IAC <sub>√</sub>	0.376	0.822	
TAP <sub>√</sub>	0.716	0.420	0.799

## 5.3 STRUCTURAL MODEL

The structural model in Figure 3 depicts the inter-relationship between exogenous and endogenous constructs (Awang et al., 2023; Erlina and Muda, 2018; Rahlin et al., 2020). Exogenous constructs include professional skepticism and inter-agency cooperation, while endogenous constructs encompass tax auditors' performance.

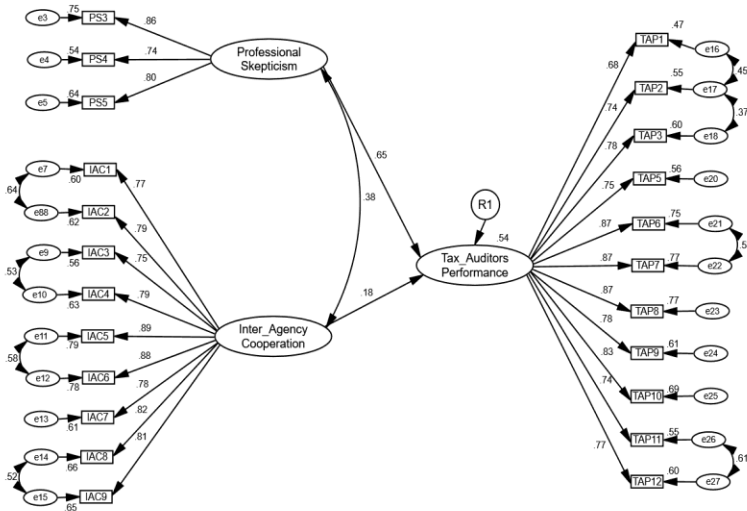
In general, the structural model demonstrates the theoretical and conceptual framework for the path model (Asrami and Aghaei, 2023; Khairi et al., 2024). This model was utilized to test the hypotheses of this study through path analysis in SEM. Specifically, the study employed the structural model to examine the causal effects (direct relationship) between the exogenous constructs (professional skepticism and inter-agency cooperation) and endogenous constructs (tax auditors' performance). Additionally, using the same structural model, the investigation explored the moderating effects of task complexity on the relationship between professional skepticism, inter-agency cooperation, and tax auditors' performance. Table 4 outlines

the standardized estimates derived from the structural model depicted in Figure 3, which was used for hypothesis testing for H1 and H2.

TABLE 4  
Standardized Estimates

Hypothesis	Description	Estimate	S.E.	C.R.	P-value	Results
H1	TAP ← PS	0.157	0.043	3.692	***	Supported
H2	TAP ← IAC	0.673	0.066	10.176	***	Supported

FIGURE 3  
Structural Model



Chi-Square=647.153; p value (>.05)=.000  
 DF=219  
 Relative Chi-Sq (<5.0)=2.955  
 GFI (>=.9) =.862  
 AGFI (>=.9) =.827  
 CFI (>=.9) =.946  
 IFI (>=.9) =.946  
 NFI (>=.9) =.921  
 TLI (>=.9) =.938  
 RMSEA (<=.08) =.073  
 AIC (lower better)=761.153  
 (Standardized estimates)

#### 5.4 PROFESSIONAL SKEPTICISM AND TAX AUDITORS' PERFORMANCE

This study provides empirical evidence that examined the influence of professional skepticism on tax auditors' performance. The statistical analysis ( $\beta = 0.157$ , S.E. = 0.043, C.R. = 3.692,  $p < 0.05$ ) discovered that professional skepticism influences tax auditors' performance. Hence, the hypothesis testing for H1, which indicates professional skepticism is positively significant in tax auditors' performance, is supported as confirmed by the statistical analysis in SEM. This study found that when professional skepticism increased by one unit, tax auditors' performance also increased by 0.157 units. This means that the higher the level of professional skepticism among tax auditors, the higher their performance will be.

Findings of the study are consistent with previous studies confirming that auditors' performance is influenced by professional skepticism (Hussin et al., 2017; Peytcheva, 2014). Professional skepticism is an important factor influencing tax auditors' performance (Septian and Astika, 2019). Standard auditing practices require appropriate professional skepticism among tax auditors in tax auditing activities, which also impacts their performance (Eutsler, Norris, and Trompeter, 2018).

The results are supported by attribution theory developed by Fritz Heider in 1958. According to the theory, internal factors such as professional skepticism are based on tax auditors' abilities and internal strength, influencing their behavior (Yuhertiana, Patrioty, and Mohamed, 2019). Tax auditors are expected to exercise professional skepticism in tax auditing activities, engaging in questioning minds to evaluate audit evidence. This means that in the context of this study, attribution theory explains how tax auditors interpret an event and the causes of their behavior (Juanamasta et al., 2019).

#### 5.5 INTER-AGENCY COOPERATION AND TAX AUDITORS' PERFORMANCE

The findings of this study indicate that inter-agency cooperation influenced tax auditors' performance ( $\beta = 0.673$ , S.E. = 0.066, C.R. = 10.176,  $p < 0.05$ ). H2 is supported based on the empirical evidence confirming that inter-agency cooperation significantly influences tax auditors' performance. The findings suggest that an increase in inter-agency cooperation by one unit will lead to a 0.673 unit increase in tax auditors' performance.

Inter-agency cooperation plays a pivotal role in tax auditing activities, which can enhance and expedite the tax auditing process. The approaches to inter-agency cooperation in tax auditing activities involve sharing or exchanging data and information among the parties involved. Recognizing the significance of inter-agency cooperation, the Collection Intelligence Arrangement (CIA) has been established in countries such as Malaysia to facilitate data and information exchange. Furthermore, the OECD (2017) highlights the importance of inter-agency cooperation for sharing data and information among tax authorities, government agencies, and relevant bodies. Inter-agency cooperation enhances the effectiveness and efficiency of data and information exchange in tax matters, especially in tax auditing (Nwonyuku, 2017). Therefore, tax authorities are encouraged to leverage opportunities for collaboration with other agencies to ensure the success of tax administrations, including tax auditing (Nagy and LeDrew, 2022; Maslov, 2019).

## 5.6 MODERATION EFFECTS OF TASK COMPLEXITY

### 5.6.1 MODERATION EFFECTS OF TASK COMPLEXITY ON PROFESSIONAL SKEPTICISM AND TAX AUDITORS' PERFORMANCE

Hypothesis 3 (H3) posits that task complexity moderates the relationship between professional skepticism and tax auditors' performance. The study's findings utilized Structural Equation Modeling (SEM) analysis with multi-group analysis (MGA). The two categories of task complexity, namely high-level and low-level, are shown in Table 5, confirming that task complexity moderates the relationship between professional skepticism and tax auditors' performance. The Chi-Square differences between constrained and unconstrained for both low and high levels are greater than 3.84 (Awang et al., 2023; Hair et al., 2018). Both levels are significant, hence supporting H3.

Based on the expectancy theory elements, in tasks with lower complexity, tax auditors believe the tasks are easy to predict the desired performance. Professional skepticism may still be maintained in less complex audit tasks; however, the effort-performance expectancy remains high as the tasks are straightforward to complete. Conversely, in more complex audit tasks, the effort-performance expectancy is less clear, leading to concerns about uncertainty regarding the desired performance level. Syafitri (2016) emphasized the importance of applying a higher level of professional skepticism

in complex audit environments. Tasks with higher complexity require a higher level of professional skepticism. Tax auditors may enhance the thoroughness of the review process to complete such tasks. Consequently, the relationship between professional skepticism and tax auditors' performance weakens in more complex tasks (high level of task complexity) as these tasks are more likely to reduce performance levels, limiting the willingness to exert a higher level of professional skepticism.

TABLE 5  
Moderation Effects of Task Complexity on Professional Skepticism and Tax Auditors' Performance

Description	Constrained Model	Unconstrained Model	Chi-Square Difference	Result on Moderation
Low-Level of Task Complexity				
Chi-Square	546.581	540.557	6.024	Significant and supported
DF	220	219	1	
High-Level of Task Complexity				
Chi-Square	491.675	484.412	7.263	Significant and supported
DF	220	219	1	

The second element in the expectancy theory pertains to instrumentality. Tax auditors believe that achieving the desired performance will lead to specific outcomes or rewards such as good audit quality reports, personal satisfaction, or career growth. In less complex audit tasks, the belief in instrumentality elements is clearer as there is a direct link between performance and rewards. For instance, tax auditors who meticulously perform their tasks and exercise professional skepticism can easily identify errors or fraud, leading to specific outcomes or rewards. In tasks with high complexity, however, the instrumentality elements are ambiguous. Even when applying high professional skepticism, tax auditors find evaluating the rewards or outcomes challenging, potentially diminishing the belief that performance will lead to a specific outcome or reward.

Lastly, the third element in expectancy theory is the value the individual places on the outcome or reward (valence). The value assigned to outcomes may not significantly change with task complexity, but the perceived achievability of the outcomes can

influence it. In simpler tasks, achieving the desired outcome may be viewed as more probable and valuable, reinforcing the significance of maintaining professional skepticism. Contrarily, in more complex tasks, if the outcomes seem uncertain or the rewards are harder to attain due to inherent challenges, the perceived value of the outcome may decrease. This could reduce motivation to make an effort, even if the individual maintains a skeptical mindset.

#### 5.6.2 MODERATION EFFECTS OF TASK COMPLEXITY ON INTER-AGENCY COOPERATION AND TAX AUDITORS' PERFORMANCE

This study predicts Hypothesis 4 (H4), which posits that task complexity moderates the relationship between inter-agency cooperation and tax auditors' performance. The results of the hypothesis testing using Structural Equation Modelling (SEM) analysis in Table 6 indicate that the Chi-Square differences between constrained and unconstrained for low levels (46.886) and high levels (87.907) are greater than 3.84. Consequently, both levels are significant, with a degrees of freedom (DF) value equal to 1. The findings of this study suggest that task complexity moderates the relationship between inter-agency cooperation and tax auditors' performance. Thus, H4 is supported by confirming the moderation effects of task complexity on the relationship between inter-agency cooperation and tax auditors' performance.

TABLE 6  
Moderation Effects of Task Complexity on Inter-Agency Cooperation And Tax Auditors' Performance

Description	Constrained Model	Unconstrained Model	Chi-Square Difference	Result on Moderation
Low-Level of Task Complexity				
Chi-Square	587.443	540.557	46.886	Significant and supported
DF	220	219	1	
High-Level of Task Complexity				
Chi-Square	572.319	484.412	87.907	Significant and supported
DF	220	219	1	

First, drawing from the expectancy theory, tax auditors believe that increasing their efforts, particularly in inter-agency cooperation in tax auditing, will lead to improved performance. In other words, auditors believe that cooperation among tax authorities,

government agencies, and related entities in taxation enhances their ability to perform audit tasks. Task complexity however, can moderate the relationship between inter-agency cooperation and tax auditors' performance. Tax auditors might have less confidence in their abilities in situations of high task complexity, such as financial or banking transactions requiring specific knowledge and skills. In this context, inter-agency cooperation can provide access to specific knowledge and skills, data, information, and technology necessary to accomplish the tasks. For example, collaborating with a financial institution could provide vital information in audits involving complex financial or banking transactions demanding additional evidence. Therefore, such efforts, including support from inter-agency cooperation, can streamline the auditing process, resulting in improved performance and strengthening the relationship between inter-agency cooperation and tax auditors. Conversely, in situations of low task complexity, tax auditors may believe they can handle tasks independently without relying heavily on inter-agency cooperation, leading to a weaker relationship between inter-agency cooperation and tax auditors' performance.

Second, within the instrumentality framework, tax auditors believe that improved performance leads to desired outcomes or specific rewards in tax auditing, such as high-quality audit reports, compliance, and recognition. In scenarios of high task complexity, tax auditors perceive inter-agency cooperation as a pathway to achieving desired outcomes more easily. Accordingly, as achieving desired outcomes becomes more critical in these complex tasks, inter-agency cooperation becomes more significant and influential. The belief that inter-agency cooperation can facilitate the attainment of desired outcomes motivates auditors to focus more on cooperation in completing audit tasks, thereby strengthening the relationship between inter-agency cooperation and tax auditors' performance. Conversely, inter-agency cooperation may not be deemed as crucial for audit tasks in situations of low task complexity where the audit process is relatively straightforward. Tax auditors may view inter-agency cooperation as having minimal impact on desired outcomes, thereby weakening the relationship between inter-agency cooperation and tax auditors' performance.

Lastly, based on the valence element, which denotes the value of desired outcomes resulting from performance, task complexity can enhance the importance of achieving desired outcomes in auditing. In simple audit tasks, auditors may assume that completing the task is

straightforward and does not necessitate inter-agency cooperation. Tax auditors operating in these simple task scenarios believe that involving inter-agency cooperation is unnecessary as it may not yield significant results or value. Consequently, the relationship between task complexity and tax auditors' performance tends to be weak in such situations. Conversely, in more complex audit tasks, auditors may require coordination and cooperation among involved parties to successfully complete the task. This enhances the relationship between inter-agency cooperation and tax auditors' performance in highly complex audit tasks, yielding higher value.

## 6. CONCLUSION

Using a sample of 370 tax auditors from IRBM and RMCD, this study examined the factors that influence professional skepticism and audit technology on tax auditors' performance based on attribution theory. Attribution theory, developed by Fritz Heider, argues that internal and external factors influence an individual's behavior. Internal factors are originally within an individual's control, such as professional skepticism, while external factors, such as inter-agency cooperation, come from outside an individual's control.

Based on the statistical analysis using SEM, this study concluded that the internal factor of professional skepticism and the external factor of inter-agency cooperation influence tax auditors' performance. This indicates the importance of professional skepticism and inter-agency cooperation in tax auditing activities, implying that higher professional skepticism and inter-agency cooperation leads to better performance.

Further analysis of the moderating effects of task complexity has confirmed that task complexity moderates the relationship between auditor effort and inter-agency cooperation using Expectancy Theory. The moderating effects of task complexity will either strengthen or weaken the relationship based on three key elements, namely: (1) Expectancy (Effort-Performance), (2) Instrumentality (Performance-Outcome), and (3) Valence (Value of Outcomes).

### 6.1 IMPLICATIONS

This study provides theoretical and practical implications. Theoretically, this study contributes to the body of knowledge in the field of taxation, specifically in tax auditing. The findings offer empirical evidence through Structural Equation Modeling (SEM)

analysis that examines hypothesis testing for the study. By utilizing attribution theory, the study confirms the impact of internal factors (professional skepticism) and external factors (inter-agency cooperation) on tax auditors' performance. Furthermore, expectancy theory verifies the effect of task complexity as a moderator on the relationship between professional skepticism and inter-agency cooperation on tax auditors' performance.

This study is beneficial for the Inland Revenue Board of Malaysia (IRBM) and the Royal Malaysian Customs Department (RMCD) as the tax authorities in Malaysia, by providing valuable insights into the significance of professional skepticism, inter-agency cooperation, and task complexity to enhance tax auditor performance. For instance, tax authorities can develop tailored training programs focused on improving auditors' professional skepticism and their ability to detect potential risks and biases. These programs could include case studies, simulations, and role-playing exercises. Additionally, tax authorities can establish secure platforms for regulatory bodies to exchange or share data and information while maintaining data confidentiality. Moreover, the study's findings are valuable for informing policy making and identifying existing policy gaps to design appropriate training and management support to promote effectiveness and efficiency in tax auditing activities, thereby enhancing tax auditors' performance. Finally, the performance evaluation should integrate professional skepticism, inter-agency cooperation, and task complexity to assess auditors' capacity to collaborate effectively with other agencies, handle intricate audit issues, and demonstrate high professional skepticism. Hence, tax authorities should allocate resources appropriately and pinpoint areas where supplementary support or training may be required.

## 6.2 LIMITATIONS AND FUTURE STUDY

The limitations of the study solely concentrate on the impact of professional skepticism, inter-agency cooperation, and the moderating effects of task complexity on tax auditors' performance. According to attribution theory, additional variables (both internal and external factors) exist that were not investigated in the study. Therefore, future research should explore other variables by combining internal and external factors to examine their influence on tax auditors' performance.

## REFERENCES

- Ahmad, S.R., H. Hariri, S.N.H.M. Zawawi, and R. Hassan. "Determinants of Auditors' Work Performance." *International Journal of Financial Research* 10, no. 3 (2019): 230–38.
- Alissa, W., V. Capkun, T. Jeanjean, and N. Suca. "An Empirical Investigation of the Impact of Audit and Auditor Characteristics on Auditor Performance." *Accounting, Organizations and Society* 39, no. 7 (2014): 495–510.
- Alzeban, A., and D. Gwilliam. "Factors Affecting the Internal Audit Effectiveness: A Survey of the Saudi Public Sector." *Journal of International Accounting, Auditing and Taxation* 23, no. 2 (2014): 74–86.
- Asmara, R.Y. "Effect of Complexity, Due Professional Care and Auditor Ethics on Audit Quality at Public Accountant Offices in South Jakarta." *International Journal of Multidisciplinary Research* 5, no. 12 (2019): 18–25.
- Asrami, M.A., and M.A. Aghaei. "Modeling the Impact of Accounting Conservatism on Information Behaviour in Equity Valuation Based on PLS-SEM." *International Journal of Economics, Management and Accounting* 31, no. 2 (2023): 275–98.
- Awang, Zainudin., Afthanorhan Asyraf, Hui S. Lim., Zainudin F.S. Nur. *SEM Made Simple 2.0: A Gentle Approach of Structural Equation Modelling*. Malaysia: Penerbit Unisza, 2023.
- Bahkia, A.S., Z. Awang, A. Afthanorhan, P.L. Ghazali, P and H. Foziah. "Exploratory Factor Analysis on Occupational Stress in Context of Malaysian Sewerage Operations." *Proceeding of the 4th Innovation and Analytics Conference & Exhibition (IACE 2019)*, School of Quantitative Sciences, Universiti Utara Malaysia, EDC Hotel, UUM Sintok, 25-28 March 2019.
- Bratten, B., L.M. Gaynor, L.S. McDaniel, N.R. Montague, and G.E. Sierra. "The Audit of Fair Values and Other Estimates: The Effects of Underlying Environmental, Task, and Auditor-Specific Factors." *Auditing: A Journal of Practice and Theory* 32 (2013): 7–44.
- Chen, Y.H., K.J. Wang, and S.H. Liu. "How Personality Traits and Professional Skepticism Affect Auditor Quality? A Quantitative Model." *Sustainability* 15, no. 2 (2023): 1547.
- Collier, Joel E. *Applied Structural Equation Modeling using AMOS: Basic to Advanced Techniques*. New York: Routledge Taylor and Francis Group, 2020.

- Costumato, L. "Collaboration among Public Organizations: A Systematic Literature Review on Determinants of Inter-Institutional Performance." *International Journal of Public Sector Management* 34, no. 3 (2021): 247–73.
- Curnin, S., and C. Owen. "A Typology to Facilitate Multi-agency Coordination." *Proceedings of the 10th International Conference on Information Systems for Crisis Response and Management (ISCRAM 2013)*, Baden-Baden, Germany, 12-15 May 2013.
- Douglas, C.M., and D.H. Milton. "Effects of Objective and Subjective Task Complexity on Performance." *Human Performance* 10, no. 4 (1997): 303–30.
- Erlina, and I. Muda. "The Effect of Self-Efficacy and Professional Development on the Work Quality of Internal Auditor." *International Journal of Civil Engineering and Technology* 9, no. 5 (2018): 1292–304.
- Ervin, N. "Assessing Interagency Collaboration through Perceptions of Families." *Journal of Community Health Nursing* 21, no. 1 (2004): 49–60.
- Eutsler, J., A.E. Norris, and G.M. Trompeter. "A Live Simulation-Based Investigation: Interactions with Clients and Their Effect on Audit Judgment and Professional Skepticism." *Auditing: A Journal of Practice & Theory* 37, no. 3 (2018): 145–62.
- Falola, I., O. Tams-aliasia, and U. Udochukwu. "Auditing Standards and Auditors Performance: A Study of Nigerian Banks." *Proceedings of the 3rd International Conference on Green Energy Technologies (ICGET 2018)*, Amsterdam, Netherlands, 10-12 July 2018.
- Ferris, G.R., T.A. Beehr, and D.C. Gilmore. "Social Facilitation: A Review and Alternative Conceptual Model." *Academy of Management* 3, no. 2 (1978): 338–47.
- Fornell, C.G., and D.F. Larcker. "Evaluating Structural Equation Models with Unobservable Variables and Measurement Error." *Journal of Marketing Research* 18, no. 1 (1981): 39–50.
- Fullerton, R., and C. Durtschi. "The Effect of Professional Skepticism on the Fraud Detection Skills of Internal Auditors." *SSRN Electronic Journal* 435 (2011).
- Hair, Joseph F., William C. Black, Barry J. Babin, and Rolph E. Anderson. *Multivariate Data Analysis* (8th Edition). United Kingdom: Annabel Ainscow, 2018.
- Hamza, M.A.A. "Factors Affecting Internal Audit Effectiveness

- Jordanian Public Sector: Moderating Effect of Task Complexity.” [Unpublished Ph.D.’s thesis]. Universiti Utara Malaysia, 2020.
- Heider, Fritz. *The Psychology of Interpersonal Relations*. New York: John Wiley & Sons, 1958.
- Hurttt, R.K. “Development of a Scale to Measure Professional Skepticism.” *Auditing: A Journal of Practice & Theory* 29, no. 1 (2010): 149–71.
- \_\_\_\_\_, H.B. Liburd, C.E. Earley, and G. Krishnamoorthy. “Research on Auditor Professional Skepticism: Literature Synthesis and Opportunities for Future Research.” *Auditing: A Journal of Practice & Theory* 32 (2013): 45–97.
- Hussein, F., and M. Hanefah. “Overview of Surrogates to Measure Audit Quality.” *International Journal of Business and Management* 8, no. 18 (2013): 84–91.
- Hussin, S.A.H.S., T.M. Iskandar, N.M. Saleh, and R. Jaffar. “Professional Skepticism and Auditors’ Assessment of Misstatement Risks: The Moderating Effect of Experience and Time Budget Pressure.” *Economics and Sociology* 10, no. 4 (2017): 225–50.
- Juanamasta, I.G., N.M.N. Wati, E. Hendrawati, W. Wahyuni, M. Pramudianti, N.S. Wisnujati, A.P. Setiawati, S. Susetyorini, U. Elan, R. Rusdiyanto, L.T. Muharlisiani, and M.C.B. “The Role of Customer Service Through Customer Relationship Management (CRM) To Increase Customer Loyalty and Good Image.” *International Journal of Scientific and Technology Research* 8, no. 10 (2019): 2004–007.
- Khairi, S.M.M., N.M. Nor, E.R. Johar, and H. Rosnah. “Knowledge Management Practices and Academician Well-Being: A Case Study of Selected Private Universities in Malaysia.” *International Journal of Economics, Management and Accounting* 32, no. 1 (2024): 101–27.
- Klijin, E.H., V. Sierra, T. Ysa, E. Berman, J. Edelenbos, and D. Chen. “The Influence of Trust on Network Performance in Taiwan, Spain, and the Netherlands: A Cross-country Comparison.” *International Public Management Journal* 19, no. 1 (2016): 111–39.
- Kline, Rex B. *Principles and Practice of Structural Equation Modelling* (4th Edition): New York: The Guilford Press, 2016.
- Kusumastuti, R., I. Ghozali, and F. Fuad. “Auditor Professional Commitment and Performance: An Ethical Issue Role.” *Risk Governance and Control: Financial Markets and Institutions* 6

- (2016): 540–48.
- Linda, K., M.B. Claire, H.H. Vincent, V.B. Stef, D.B. Van, and C.W. Henrica. "Improving the Individual Work Performance Questionnaire using Rasch Analysis." *Journal of Applied Measurement* 15, no. 2 (2014): 160-75.
- Lundin, M. "When Does Cooperation Improve Public Policy Implementation?" *The Policy Studies Journal* 35, no. 4 (2007): 629–52.
- Mahfouz, S.A., Z. Awang, H. Muda, and A.S. Bahkia. "Mediating Role of Employee Commitment in the Relationship Between Transformational Leadership Style and Employee Performance." *Humanities and Social Sciences Reviews* 8, no. 2 (2020): 624–37.
- Maslov, K. "Obtaining Tax-Relevant Information from Domestic Sources by Tax Authorities: Russian and International Experience." *Financial Law Review* 2, no. 14 (2019): 41–58.
- Muhammad, I. "Managing Mixed Responsibilities: A Grounded Theory of Malaysian Tax Auditors' Dispute Resolution Behaviour in Audit Settlement." [Unpublished Ph.D.'s thesis]. University of New South Wales, 2013.
- Muindi, F., and P.K. Obonyo. "Quality of Work Life, Personality, Job Satisfaction, Competence and Job Performance: A Critical Review of Literature." *European Scientific Journal* 11, no. 26 (2015): 223–40.
- Nagy, J., and W. LeDrew. "Customs Enforcement and Cooperation with Other Administrations. In *Customs Matters: Strengthening Customs Administration in a Changing World*. Working Paper in International Monetary Fund (2022): 175–203.
- Nazri, S.N.F.S.M., M.I.A. Rasib, and S. Zolkifli. "The Influence of Competency, Usage of it and Career Expectation on Internal Auditor's Effectiveness in Government Linked Companies (GLCs)." *International Journal of Financial Research* 10, no. 3 (2019): 337–52.
- Nwonyuku, K. "Impact of Collaboration Amongst Tax Authorities on Revenue Generation and Service Delivery to Taxpayers in Nigeria." *SSRN Electronic Journal* (2017).
- OECD. "Effective Inter-Agency Co-Operation in Fighting Tax Crimes and Other Financial Crimes (3rd Edition)." Working Paper in OECD, 2017.
- Owens Jeffrey, Rick McDonell, Riel Franzsen, Jude Amos. *Inter-Agency Cooperation and Good Tax Governance in Africa*.

- Pretoria: Pretoria University Law Press, 2017.
- Pedro, J.R.V., R.B. Juan, F.D.R. Elena, and K. Linda. "Assessing Job Performance Using Brief Self-Report Scales: The Case of the Individual Work Performance Questionnaire." *Journal of Work and Organizational Psychology* 35, no. 3 (2019): 195–205.
- Peytcheva, M. "Professional Skepticism and Auditor Cognitive Performance in a Hypothesis-Testing Task." *Managerial Auditing Journal* 29, no. 1 (2014): 27–49.
- Queirós, A., F. Daniel, and F. Almeida. "Strengths and Limitations of Qualitative and Quantitative Research Methods." *European Journal of Education Studies* 3, no. 9 (2017): 369–87.
- Rahlin, N.A., Z. Awang, M.Z. Abdul Rahim, and A.S. Bahkia. "The Impact of Employee Safety Climate on Safety Behavior in Small & Medium Enterprises: An Empirical Study." *Humanities and Social Sciences Reviews* 8, no. 3 (2020): 163–77.
- Ramesh, R.L., N.A. Sulaiman, and Z. Zakaria. "A Preliminary Study on Auditors' Performance Attributes – Perceptions from Accounting Firm Practitioners." *Asian Journal of Accounting Perspective* 15, no. 2 (2021): 1–21.
- Raosoft, I. "Sample Size Calculator: Makes High Quality Web Survey Software." 2004. <http://www.raosoft.com/samplesize.html>
- Rashid, N., N.A. Hamid, A.H. Assar, R.M. Noor, Z.A. Rasit, S. Jaafar, and A.S. Yazid. "Determinants of Indicators for Risk Management Process of Royal Malaysian Customs Department." *International Journal of Academic Research in Business and Social Sciences* 8, no. 12 (2018): 1278–300.
- Ratnawati, V. "Factors Affecting Tax Auditors' Performance: The Moderating Role of Locus of Control." *Problems and Perspectives in Management*, 18, no. 2 (2020): 36–45.
- Rehman, S., T. Bano, and A. Bhatti. "Factors Influencing Online Purchase Intention with the Mediating Role of Customer Satisfaction." *International Journal of Economics, Management and Accounting* 27, no. 1 (2019): 235–52.
- Rose, J.M. "Attention to Evidence of Aggressive Financial Reporting and Intentional Misstatement Judgments: Effects of Experience and Trust." *Behavioral Research in Accounting* 19 (2007): 215–29.
- Sabri, M.F., M. Anthony, S.H. Law, H. Rahim, N.A.S. Burhan, and M. Ithnin. "Impact of Financial Behaviour on Financial Well-Being: Evidence Among Young Adults in Malaysia." *Journal of Financial Services Marketing* 29, no. 3 (2023): 788–807.
- Sanusi, Z.M., T.M. Iskandar, S.M. Gary, and N.M. Saleh. "Effects of

- Goal Orientation, Self-Efficacy and Task Complexity on the Audit Judgement Performance of Malaysian Auditors.” *Accounting, Auditing and Accountability Journal* 31, no. 1 (2018): 75–95.
- Sarwar, M., Z. Awang, M. Habib, J. Nasir, and M. Hussain. “Why Did I Buy This? Purchase Regret and Repeat Purchase Intentions: A Model and Empirical Application.” *Journal of Public Affairs* 22, no. 1 (2022): e2357.
- Saunders, Mark N.K., Philip Lewis, and Adrian Thornhill. *Research methods for business students* (8th Edition). United Kingdom: Pearson Education Limited, 2019.
- Sekaran, Uma. *Research Methods for Business: A Skill Building Approach* (4th Edition). New York: John Wiley & Sons, 2003.
- Septian, I., and I.B.P. Astika. “Halo Effect Moderating: Impact of Professional Skepticism on Auditor Performance.” *International Research Journal of Management, IT & Social Sciences* 6, no. 4 (2019): 189–96.
- Solichin, M., Z.M. Sanusi, R.J. Johari, and T. Gunarsih. “Effects of Professional Skepticism, Competency and Workload Compression on the Ability to Detect Possible Fraud among Government Auditors.” *Asia-Pacific Management Accounting Journal* 16, no. 3 (2021): 133-58.
- Sulaiman, N., S. Shahimi, and R.K.N. Singh. “People and Audit Process Attributes of Audit Quality: Evidence from Malaysia.” *Management and Accounting Review* 18, no. 2 (2019): 47–80.
- Sullivan, H., and C. Skelcher. “Working Across Boundaries: Collaboration in Public Services.” *Health and Social Care in the Community* 11, no. 2 (2003): 185.
- Sunyoto, Y., I. Ghozali, and A. Purwanto. “Analysis of Auditor Performance by Using Covariance Based Structural Equation Modeling: A Study of Public Accounting Firms in Indonesia.” *European Research Studies Journal* 20 (2017): 524–37.
- Susan, Chandler M. *Making Collaboratives Work*. New York: Routledge, 2019.
- Syafitri, Y. “Pengaruh Tekanan Ketaatan, Kompleksitas Tugas, dan Pengalaman Auditor Terhadap Pertimbangan Audit.” *Al-Masraf: Jurnal Lembaga Keuangan Dan Perbankan* 1, no. 2 (2016): 161–78.
- Thottoli, M.M., and E.R. Ahmed. “Determining Factors and its Adoption by Auditing Limited Liability Partnerships: Mediating Effect of IT Confidence.” *International Journal of Economics,*

- Management and Accounting* 31, no. 1 (2023): 99–126.
- Wahidahwati, W., and N.F. Asyik. “Determinants of Auditors Ability in Fraud Detection.” *Cogent Business and Management* 9, no. 1 (2022): 1-20.
- Widyakusuma, A., M. Sudarma, and R. Roekhudin. “The Effect of Professionalism and Experience on Audit Judgment with Task Complexity as a Moderating Variable.” *International Journal of Multicultural and Multireligious Understanding* 6, no. 2 (2019): 97–112.
- Wistawan, M.A.P., and N.N.S.R. Damayanti. “The Effect of Self-Efficacy on Auditor Performance with Motivation as Mediation.” *Research Journal of Finance and Accounting* 10, no. 24 (2019): 178–84.
- Yang, K., and J.Y. Hsieh. “Managerial Effectiveness of Government Performance Measurement: Testing A Middle-Range Model.” *Public Administration Review* 67, no. 5 (2007): 861–79.
- Yuhertiana, I., C.N. Patrioty, and N. Mohamed. “The Moderating Effect of Organizational Changes on the Influence of Ethical Decision Making on Public Sector Internal Auditor Performance.” *Contemporary Economics* 13, no. 4 (2019): 480–93.
- Yusof, Y., Z. Awang, K. Jusoff, and Y. Ibrahim. “The Influence of Green Practices by Non-Green Hotels on Customer Satisfaction and Loyalty in Hotel and Tourism Industry.” *International Journal of Green Economics* 11, no. 1 (2017): 1–14.
- Zandi, G., and A.S.M. Elwahi. “Tax Compliance Audit: The Perspectives of Tax Auditors in Malaysia.” *Asian Development Policy Review* 4, no. 4 (2016): 143–49.



## **INFLUENCE OF TRADE WAR SENTIMENT ON STOCK MARKET AND BITCOIN: A WAVELET COHERENCE APPROACH**

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### **ABSTRACT**

The massive amount of information shared on social media regarding certain issues could influence user sentiments. This study examined the importance of users' sentiments in Twitter platform regarding the trade war related to the S&P 500, MSCI China, and Bitcoin returns. The wavelet coherence method was utilized to examine the issue, which involved daily data observation spanning 4 March 2020 to 20 January 2021. The estimations revealed that users' sentiments showed significant co-movement with the returns on S&P 500, MSCI China, and Bitcoin. The finding may be useful for both policymakers and investors in their efforts to create strategies to reduce market volatility, particularly in navigating through undesired future events. It can particularly assist investors in developing profitable investment strategies for volatile markets.

JEL Classification: E70, E71, G11, G14, G15, G41

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## 1. INTRODUCTION

Trade war refers to a nation's initiative in imposing tariffs or trade quotas on imported goods from other countries with the intention of protecting the domestic market. By implementing this, the competitive advantage of domestic product manufacture can be increased thus boosting the potential to generate more local job opportunities. The United States (US) trade war not only disrupts international trade but also affects the international financial market performance. In 2018, the stock market of several countries experienced a very steep decline in the last decade. The S&P 500 stock for example recorded a decline of greater than 6%, followed by the Hang Seng and Shanghai indices which also declined by 13% and 25% respectively (Huynh and Burggraf, 2020). This situation was exacerbated when the former US president Donald J. Trump recorded on Twitter every intended political and trade war moves, prior to the official announcement. Unsurprisingly, Trump's official Twitter account (@realdonaldtrump) was selected as the world's most influential Twitter user in 2020<sup>1</sup>.

The Office of the US Trade Representative, in 2017, had accused China of engaging in unfair trade practices and stealing intellectual property. Tensions between the two countries further escalated with the imposition of trade sanctions by the US when Trump signed a memorandum in the World Trade Organization (WTO) on 22<sup>nd</sup> March 2018, to file a case against China that restricted her investment in crucial technology areas (Yujie Shi, Liming Wang and Jian Ke, 2021). The situation was further exacerbated with Trump's frequent tweets that influenced shareholder sentiments which also carried adverse implications on the global stock market. On 5<sup>th</sup> May 2019, for example, the president posted his tweet announcing an increase in tariffs amounting to 200 billion USD of imported goods from China which caused a loss of 1.36 trillion on the global stock market (Burggraf, Fendel and Huynh, 2019). In consequence, investors refrained from investing in the stock market for fear of adverse potential impact from the ensuing trade war and were thus forced to look for alternative investment opportunities (Xiaofan Peng, 2019). Accordingly, many investors chose to invest in Bitcoin to protect their profits (Plakandaras, Bouri and Gypta, 2019). Bouri et al. (2020) however stated that the trade conflicts between the two countries could affect the Bitcoin market as well. Bitcoin nevertheless became popular among investors, and its price peaked in December 2017 at 19,343.04 USD<sup>2</sup>. Nearly 70% of the USD currency was used in Bitcoin transaction since 2017<sup>3</sup> which indicated that investors were

beginning to structure new investment strategies and give high priority to cryptocurrency.

According to earlier research on behavioral economics (Bheenick et al., 2022; Anastasiou, Ballis, and Drakos, 2021; Ding et al., 2020; Kraaijeveld and De Smedt, 2020; Reis and Pinho, 2020) human sentiment can significantly influence their behavior and decision-making process. Such sentiment most undoubtedly resulted in the cryptocurrency prices spike around the middle of 2017. At the same time, the frequency of user access to Twitter and Google searches for cryptocurrency news also increased dramatically<sup>4</sup>. Twitter was launched in 2006 and this platform has provided a space for people worldwide to share their thoughts and emotions through short messages known as “tweets”. The Twitter platform has become a vital source for obtaining the latest information<sup>5</sup>. In recent times, Twitter was increasingly used in many studies on predictions of cryptocurrency (Öztürk and Bilgiç, 2021; Kraaijeveld and De Smedt, 2020) and election results (Sprenger et al., 2014; Birmingham and Smeaton, 2011). Furthermore, sentiment analysis from Twitter data might enhance prediction of stock market movement (Raja Solan et al., 2023a; Soudeep, 2021; Ranco et al. 2015).

Yuexin et al. (2012) found a significant relationship between daily volume of tweets mentioning “S&P 500” and the S&P 500 stock price. Besides that, Kraaijeveld and De Smedt (2020) state that Twitter may potentially reflect investor emotions because, before the news became formally published, it would go viral on the platform, instantly affecting the financial markets. The rise in Twitter user access indicated that they tend to respond swiftly to an event by tweeting their views. These actions have impacted investor behaviour in an indirect way when it comes to investing decisions. Huerta et al. (2021) emphasized that researchers may be able to predict more accurately the users’ thoughts and feelings through their tweets, especially during a crisis. Ensuing public feelings toward specific problems could thus be ascertained by policymakers, enabling them to quickly formulate a framework to address the problems. Additionally, Kraaijeveld and De Smedt (2020) pointed out that Twitter may also effectively reflect investor views since news that becomes viral on Twitter, before its formal posting, would have an instantaneous impact on financial markets.

To develop valuable management strategies in future, it is crucial to comprehend the relationship between investor sentiment on particular issues and the financial markets. On this cognizance, the impact of user sentiment on Twitter platform on the returns of the S&P

500, MSCI China, and Bitcoin, during the trade war, was examined in this study. Currently, Americans are the most active Twitter users with a usage rate of 24.32%, the highest globally<sup>6</sup>. Among the top 100 cryptocurrencies in the market, Bitcoin was chosen for this study since it comprised 48% in market capitalization, the largest component.

The structure of this paper begins with an introduction in section one. Section two then presents the literature review, while section three describes the data and methodology. Section four analyses the results, and a conclusion appears in section five.

## 2. LITERATURE REVIEW

The behavioral science theory describes how individuals and their surroundings influence behavior. The financial behavior field was pioneered by Amos Tversky, Daniel Kahneman, and Richard Thaler (Thaler, 1980; Kahneman and Tversky, 1979). In this particular science, investors' decision-making processes are scrutinized, in their reaction to different financial market conditions, and the implications of their actions. Without inclusion of the consumer behavioral elements in the rational pricing model, the estimation of securities performance may tend to be overestimated or underestimated (Baker and Wurgler, 2006). Anastasiou et al. (2021) also pointed out that financial behavior was able to expose investor irrational behavior. Further, this sentiment factor can anticipate price discrepancies when a stock's price deviates from its initial value (Reis and Pinho, 2020). Conversely, the Efficient Market Hypothesis (EMH) presumes that stock prices mirror all pertinent information and signals for resource allocation (Fama, 1970). Ultimately, when an event occurs in the market that provides new knowledge to the public, the stock price will naturally revert back to its original price without producing any shock. Ding et al. (2020) stated that in real situations, investors frequently overreact and disregard historical stock price information when a negative event exerts its short-term influence on financial markets. Moreover, Kraaijeveld and De Smedt (2020) observed that the EMH is a well-known neoclassical financial markets theory which however downplays the important aspect of user behavior. Furthermore, this particular behavior is the primary focus of financial behavior theory and is recognized as a non-fundamental variable (Bourghelle, Jawadi and Rozin, 2022). Investor behavior along with psychological elements tend to impact investment decisions as well as market economic factors.

Trump, who was elected as the 45<sup>th</sup> president of the US on 8<sup>th</sup> November 2016, often used the Twitter social media platform as his main communication tool. Burggraf et al. (2019) studied the effect of Trump's political news, expressed via his 3,200 tweets, on the returns and volatility of S&P 500 stocks, between 14<sup>th</sup> September 2018 and 28<sup>th</sup> May 2019. Their predictions on the impact of trade war news on the returns and volatility of the S&P 500 were as respectively negative and positive. Tweets made by Trump, prior to his swearing-in ceremony on 20<sup>th</sup> January 2017 (Ge, Kurov and Wolfe, 2019), impacted the financial market through increasing volatility of stock prices and generally attracting investor attention. The trade war between the US and China had a profound impact on the global economy which largely changed shareholder investment strategies. The crisis raised world economic uncertainty between the two competitors (He, Rui and Ying, 2022) leading to decline in global economic growth and trade (Tsiaplias and Jiao, 2020).

Further, policy announcements on the economic uncertainty became the underlying reason for most businesses to elude commitment in long-term investments and expenditures. Such actions have led investors to avoid risky stocks, especially those likely affected by the tariff policy, thus motivating them to seek safer investment assets. This finding concurs with Xiaofan Peng (2019), who demonstrated that valuable metal assets in China act as safe investment during market turmoil. Furthermore, in the third quarter of 2018, demand for gold increased by 25% in China followed by jewelry which rose by 10%. This development proves that investors are starting to choose gold assets as a safe investment and are reluctant to invest in stocks that experienced significant trade war impact. Likewise, the study by Gjerstad et al. (2021) further strengthened the finding of Xiaofan Peng (2019) who emphasized the importance of Trump's 8,686 tweets. The results verified that the S&P 500 (US) and Hang Seng Index (China) reacted negatively to the mention of "Trade War" in his tweets as indicated by the decrease in stock prices whereas the price of gold reacted positively. The reaction proves that investors are influenced by sentiment related to the trade war in the stock market as a contrarian signal for all financial markets to help them identify the directional biases and potential trends (Bheenick et al., 2022).

The trade war sentiment ultimately entered the limelight among investors and shareholders. Shleifer and Vishny (1997) also pointed out that sentiment related to trade noise may also exert a great impact on stock prices which can significantly skew prices away from the fundamentals.

The ongoing trade war between China and the US not only impacted a country's stock market but also affected cryptocurrency. Bouri et al. (2020) examined trade war implication on Bitcoin volatility from 1<sup>st</sup> July 2017 to 30<sup>th</sup> June 2019 using the Heterogeneous Autoregressive Realized Volatility model (HAR-RV) approach. The study used Google trend data as indicator of users' sentiment via the keywords "Tariffs War" and "Tariff War US-China". It established a significant relationship between Google trends and the Bitcoin market. Conversely, Alkhatib et al. (2020) used the variable of user sentiment in Twitter on the trade war to analyze from the users' perspective. Tweet statements were collected from the Twitter API through the keywords "5G-TradeWar" and "Tariffsman". The study provided policymakers with a comprehensive understanding of users' views on the stated issues. If negative sentiments were to be dominant among the public, policymakers should be able to take appropriate action. Alkhatib et al. (2020), however, was unable to relate users' sentiment on Twitter to stock market dynamics and cryptocurrency. The study was able to demonstrate in greater detail the effect of users' sentiment regarding the trade war on the stock market and cryptocurrency.

Huynh (2021) analyzed the sentiment spillover effect of Trump's tweet statements on the Bitcoin market through examining 13,918 tweets from January 2017 to January 2020. The findings revealed that the negative sentiment on tweets was a predictive factor for Bitcoin returns, volatility, and trading volume. Further, the sentiments of Trump's tweets can act as a forecasting tool for the market even during the Covid-19 pandemic. This study can be further strengthened by taking into account the users' perception of trade war and relating it to the financial market in line with some earlier studies (Alkhatib et al., 2020; Bouri et al., 2020). It should be noted, however, that the analysis of users' sentiments on Trump's tweets is different from evaluation of the sentiments alone.

Some past studies (Ge et al., 2019; Born, Myers, and Clark, 2017) revealed the overall consequence of Trump's tweet sentiments on the stock market. Other studies (Gjerstad et al., 2021; Burggraf et al., 2019) mainly focused on the sentiment of the trade war as mentioned in Trump's tweets and its proven relationship with the stock market. In addition, studies also emphasized the importance of users' perception regarding the trade war on the Bitcoin market. Bouri et al. (2020) for example, only used Google trend data as investor sentiment and Huynh (2021) analyzed the implication of sentiment spillover of Trump's tweets on the Bitcoin market. Alkhatib et al. (2020) examined users' sentiment on Twitter related to a trade war but

did not demonstrate its consequence on the stock market nor cryptocurrency. Some studies however (Huynh, 2021; Alkhatib et al., 2020; Bouri et al., 2020; Burggraf et al., 2019; Ge et al., 2019; Born et al., 2017) can be further strengthened and made comprehensive through analyzing the relationship between users' sentiment on the stock market and cryptocurrency from the trade war perspective.

This study thus aimed at filling the knowledge gap associated with the implication of user sentiments on Twitter on the rate of return of S&P 500, MSCI China, and Bitcoin in relation to a trade war. This is in cognizance that user discussion regarding an issue on Twitter exerts an impact on investor behavior (Huerta et al., 2021). By analyzing the consequences, policymakers and investors may obtain a clearer view on the possibility of user perceptions on certain issues related to Twitter influence on the stock market and Bitcoin. If negative sentiment predominates among users over the issue, the financial market may possibly experience a negative rate of return. Thus, forewarned policymakers can consider implementing appropriate actions to change users' perceptions and thus foster a good image of government policies. In addition, investors are able to design profitable investment portfolios through observing this relationship, especially during economic crises (Huynh and Burggraf, 2019).

### 3. DATA AND METHODOLOGY

This study employed the wavelet coherence method of Grinsted, Moore and Jeyrejeya (2004) for daily observations from 4<sup>th</sup> March 2020 to 20<sup>th</sup> January 2021. This particular span was chosen since the administration of President Trump ended on 20<sup>th</sup> January 2021. Furthermore, various changes in US trade policies took effect following his term. The historical closing price data for S&P 500 and MSCI China were sourced from investing.com<sup>7</sup> and for Bitcoin from coinmarketcap.com. Using the term "Trade War" in the Rapidminer software<sup>8</sup>, a total of 64, 419 tweets were collected via the Twitter Application Programming Interface<sup>9</sup>.

#### 3.1 SENTIMENT ANALYSES AND RETURN

The Valence Aware Dictionary for Sentiment Reasoning (VADER) was used to analyze user sentiments (Hutto and Gilbert, 2004). This dictionary was also able to evaluate certain punctuations, symbols, and numbers in tweets. In addition, our study followed the data cleaning steps shown by Öztürk and Bilgiç (2021), which also employed the

VADER dictionary. Data cleanup processes included removal of all punctuation from tweets, other than #, \$, @, ‘, ’, !, “, ?, ., and webpage links and the changing of all capital letters to lowercase letters. Following this, sentiment analysis was conducted on the cleaned tweet content. According to some studies (Kraaijeveld and De Smedt, 2020; Elbagir and Jing, 2019), the VADER technique is a lexicon and rule-based sentiment analysis specifically designed and suitable for sentiments expressed on social media. When compared to machine learning techniques, VADER has several additional advantages, including the ability to analyze tweet content and extract sentiment values from emotions, emojis, punctuations, grammatical usage, slang, and acronyms (Valencia, Gómez-Espinosa and Valdés-Aguirre, 2019). In addition, three types of sentiments, namely positive sentiment, negative sentiment, and neutral sentiment, were produced by the VADER dictionary. Based on the compound score obtained for cleaned tweets from the dictionary, each tweet statement was classified into the three types of sentiment as stated. A tweet with a compound score of -1 (+1) was categorized as a negative (positive) sentiment.

Hutto and Gilbert (2014) also stated that compound scores of  $\geq 0.05$  show positive sentiments, while neutral sentiments ranged between  $> -0.05$  and  $< 0.05$ , and  $\leq -0.05$  for negative sentiments. These score ranges were also used in earlier studies that adopted the VADER dictionary (Öztürk and Bilgiç, 2021; Kraaijeveld and De Smedt, 2020). Then the total number of positive, negative, and neutral sentiments was computed daily for gathered tweets. The Python software<sup>10</sup> was used for cleaning procedures and sentiment analysis.

We used the price ( $P_t$ ) of S&P 500, MSCI China, and Bitcoin to compute the return, and  $t$  is referred to time;

$$(1) \quad \text{Return}_t = \frac{P_t - P_{(t-1)}}{P_{(t-1)}}$$

We standardized all the time series by using the Z-transformation:  $Z_t = (X_t - \mu_x) / \sigma_x$ , where  $\mu_x$  and  $\sigma_x$  are defined respectively as the mean and standard deviation of each series. This normalization is necessary since data on sentiment were rather noisy and fluctuated widely. Through transformation, all data will have a similar scale and variance, thus facilitating researchers in estimating their impact differences through numerical analysis (Garcia et al., 2014; Raja Solan et al., 2023a, 2023b).

Table 1 presents the descriptive statistics on the datasets for the S&P 500, MSCI China, and Bitcoin. This study adopted the

Augmented Dickey Fuller (ADF) (Fuller 2009) to test the stationarity of each time series. The time series is stationary when the p-value is below 0.05. Accordingly, the results indicate that all the variables are stationary at level. The unit root test for each dataset of S&P 500, MSCI China, and Bitcoin are shown in Table 2.

TABLE 1  
Descriptive Statistics

Variable	S&P 500	MSCI China	Bitcoin
<b>Return</b>			
Mean	2.09E-17	-3.84E-18	1.29E-19
Median	0.0769	0.0239	-0.0368
Maximum	3.9403	3.0761	4.0836
Minimum	-5.7289	-4.0486	-8.3488
Std. Dev	1	1	1
Skewness	-0.9277	-0.5774	-1.3845
Kurtosis	11.5503	4.7479	18.7938
<b>Positive Sentiment</b>			
Mean	4.62E-16	-5.62E-16	-5.69E-16
Median	-0.2835	-0.2819	-0.2454
Maximum	4.2272	4.1100	4.2058
Minimum	-1.3407	-1.3113	-1.3759
Std. Dev	1	1	1
Skewness	1.7561	1.8083	1.6929
Kurtosis	6.4123	6.6298	6.3708
<b>Negative Sentiment</b>			
Mean	-4.39E-16	3.43E-16	1.10E-15
Median	0.1819	0.1590	0.1462
Maximum	1.8570	1.8360	1.8852
Minimum	-3.1398	-3.0833	-3.7594
Std. Dev	1	1	1
Skewness	-0.6911	-0.6824	-0.7259
Kurtosis	3.2832	3.2372	3.5497
<b>Neutral Sentiment</b>			
Mean	3.04E-16	-7.57E-16	2.14E-16
Median	-0.1527	-0.1565	-0.1914
Maximum	6.1707	6.1117	7.4631
Minimum	-1.1842	-1.1790	-1.1537
Std. Dev	1	1	1
Skewness	2.4991	2.4310	3.0355
Kurtosis	13.2450	12.5859	18.4393

TABLE 2  
Augmented Dickey Fuller Unit Root Test

Variable	ADF			
	Level		1 st diff	
	Intercept	Trend and Intercept	Intercept	Trend and Intercept
S&P 500				
Return	-5.7847***	-5.7670***	-10.7734***	-10.8528***
Positive Sentiment	-12.9738***	-13.6340***	-12.3909***	-12.3594***
Negative Sentiment	-11.7804***	-13.1680***	-11.4176***	-11.3855***
Neutral Sentiment	-12.5529***	-13.4312***	-10.4575***	-10.4305***
MSCI China				
Return	-15.1853***	-15.2479***	-9.1781***	-9.1687***
Positive Sentiment	-13.0632***	-13.8763***	-12.7864***	-12.7546***
Negative Sentiment	-12.0552***	-13.6799***	-11.2776***	-11.2493***
Neutral Sentiment	-13.0340***	-13.9654***	-12.5134***	-12.4849***
Bitcoin				
Return	-17.5399***	-17.7732***	-12.2555***	-12.2409***
Positive Sentiment	-14.8121***	-15.8084***	-11.1729***	-11.1551***
Negative Sentiment	-13.5004***	-15.3106***	-14.5982***	-14.5732***
Neutral Sentiment	-14.5561***	-15.4493***	-15.1165***	-15.0919***

Note: \*Null hypothesis rejection at 10%, \*\*Null hypothesis rejection at 5%, \*\*\* Null hypothesis rejection at 1%.

### 3.2 WAVELET COHERENCE

The wavelet coherence approach uses the bivariate framework which is introduced under the continuous wavelet transform method. This allows the approach to demonstrate the movement between two-time series in a different time period and frequency compared to traditional econometric methods (Rua and Nunes 2009). In addition, studies (Dowling, 2022; Goodell and Goutte, 2021) have utilized the wavelet coherence approach in analyses related to cryptocurrency and the stock market.

Torrence and Compo (1998) introduced the Cross Wavelet Transform (CWT) approach for two time series  $X_t$  and  $Y_t$  that defined their own CWT  $W_n^x(a, b)$  and  $W_n^y(a, b)$  as:

$$(2) \quad W_n^{xy}(a, b) = W_n^x(a, b) * W_n^y(a, b)$$

Where,  $a$  is defined as the time period and  $b$  is referred to as the frequency. The  $*$  indicates the complex conjugate. Additionally, CWT displays the time period components that have significant movement between  $X$  and  $Y$  time series at each scale (frequency). In this study, the time series  $X$  represents the variables such as positive sentiment of trade war, negative sentiment of trade war, and neutral sentiment of trade war while the  $Y$  time series is the returns of S&P 500, MSCI China, and Bitcoin.

In accordance with Torrence and Webster (1999), we explain the wavelet coherence that shows the movement between time series  $X$  and  $Y$  as follows:

$$(3) \quad R^2(a, b) = \frac{(S(s^{-1}W^{xy}(a,b)))^2}{s(s^{-1}(W^x(a,b))^2) s(s^{-1}(W^y(a,b))^2)}$$

Where  $S$  is a smoothing operator over time as well as scale and time period between time series  $X$  and  $Y$  and  $0 \leq R^2(a, b) \leq 1$  (Rua and Nunes, 2009). Besides, the quantity  $R^2(a, b)$  represents the square of wavelet coherence and its value ranges from 0 to 1. The higher value shows the movement between two time series is high and vice versa. Unlike the classical correlation approach of two-time series, however, the squared wavelet coherence is limited to positive values only. Thus, at this stage the methodology is unable to distinguish between positive and negative co-movement or correlation. This problem can be overcome by using the phase difference approach of Terrence and Compo (1998) to show the

positive and negative co-movement between two time series. By following this, the square wavelet coherence diagram displays the causal relationships between the two-time series. Wavelet coherence phase difference is shown as:

$$(4) \quad \varphi_{xy}(a, b) = \tan^{-1} \left( \frac{\text{Im}\{S(s^{-1}W^{xy}(a,b))\}}{\text{Re}\{S(s^{-1}W^{xy}(a,b))\}} \right)$$

Where  $lm$  is the imaginary part while  $Re$  shows the real parts of the smoothed-CWT.

#### 4. RESULTS

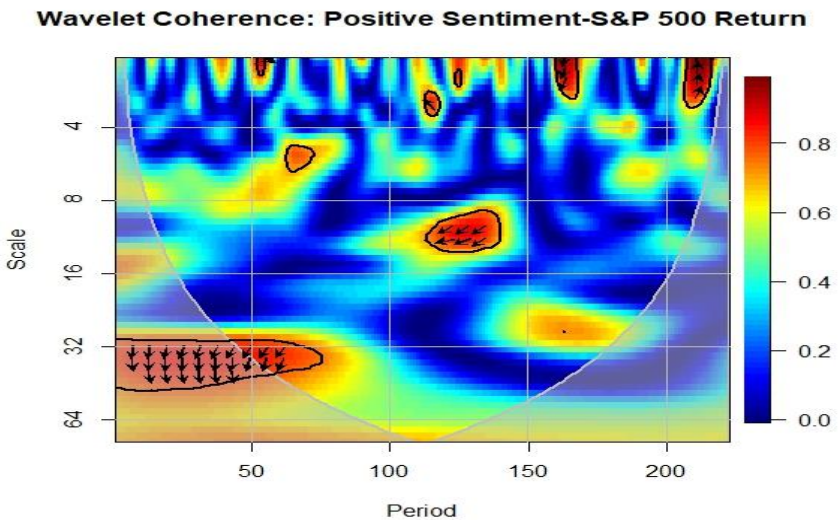
The absolute value of the square of the wavelet transformation is referred to as the wavelet power spectrum. This shows the time series variance measure for each period and scale (frequency). Accordingly, the horizontal axis presents the period (days) and the vertical axis depicts the scale (frequency). The frequency component ranges from a scale 1 (one day) to a scale of 64 (more than 64 days). The scale is divided into four levels: 1-4 days, 4-8 days, 8-16 days, 16-32 days, and scale more than 64 days. In addition, the black contours in the wavelet coherence diagram demonstrate the significant area at the 5% level. This is estimated by Monte Carlo simulation with a phase-randomized surrogate series. Furthermore, the solid white bell-shape line in the wavelet coherence plot is the cone of influence, where arrows inside (outside) of the cone are explicable (not explicable). A zero-phase difference indicates that the first and second time series move in an inhomogeneous direction.

The correlation (coherency band) ranges from red (high coherence) to blue (low coherence) colors which indicates the amount of co-movement between the two variables displayed on the right side of the figure. The red color (1.0) illustrates that the co-movement between variables is strong while the blue color (0.0) shows that the co-movement is weak, thus indicating the highest and lowest correlation value ( $R^2$ ). There are eight unique arrows ( $\rightarrow$ ,  $\leftarrow$ ,  $\uparrow$ ,  $\downarrow$ ,  $\nearrow$ ,  $\nwarrow$ ,  $\searrow$ ,  $\swarrow$ ) that explain the relationship between users' sentiment and the return of the stock market and Bitcoin on the black contour. Meanwhile, users' sentiment on trade war is considered as the first time series while the returns of the S&P 500, MSCI China, and Bitcoin is considered as the second time series. The right side ( $\rightarrow$ ) arrow and the left side ( $\leftarrow$ ) arrow indicate that users' sentiment and rate of return are in phase and out of phase respectively. Being in phase (out of

phase) shows a positive (negative) relationship between users' sentiment and rate of return. Further, the upward  $\uparrow$  and (downward  $\downarrow$ ) pointing arrow shows the sentiment (return) series leads the return (sentiment) series. Also, the forward downward (upward) arrows  $\searrow$  ( $\nearrow$ ) display a positive co-movement between two-time series where the return (sentiment) series leads the sentiment (return) series by  $\pi/2$ . On the other hand, backward upward (downward) arrows  $\nwarrow$  ( $\swarrow$ ) indicate that a negative co-movement between two-time series where the return (sentiment) leads the sentiment (return) by  $\pi/2$ .

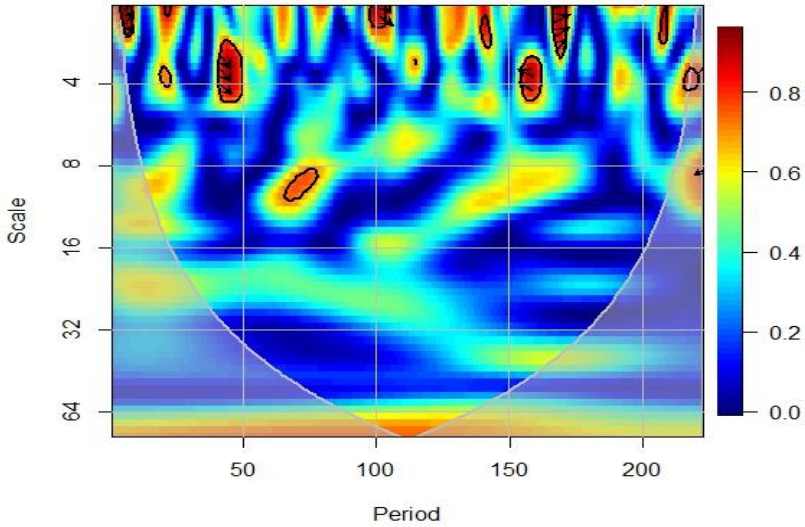
Figure 1 displays the wavelet coherence of trade war sentiment and S&P 500 return. The vertical axis shows the scale while the horizontal axis indicates the period covering from 4/3/2020 (1-day) to 20/1/2021 (223-days). Based on Figure 1, we found that positive sentiment leads and has a negative relationship ( $\swarrow$ ) with the S&P 500 return at two different periods. Starting from 13/5/2020 until 11/6/2020 on 32-40-day scales at the beginning, and later from 21/8/2020 to 21/9/2020 on 8-12 day scales the sentiment was positive and significant as indicated with light red color. Further, positive sentiment was lagging (leading) and significant with S&P 500 return from 12/10/2020 to 19/10/2020 (22/12/2020 to 30/12/2020) on 1-3-day scales as indicated in dark red.

FIGURE 1  
Wavelet Coherence of Trade War Sentiments and S&P 500 Return



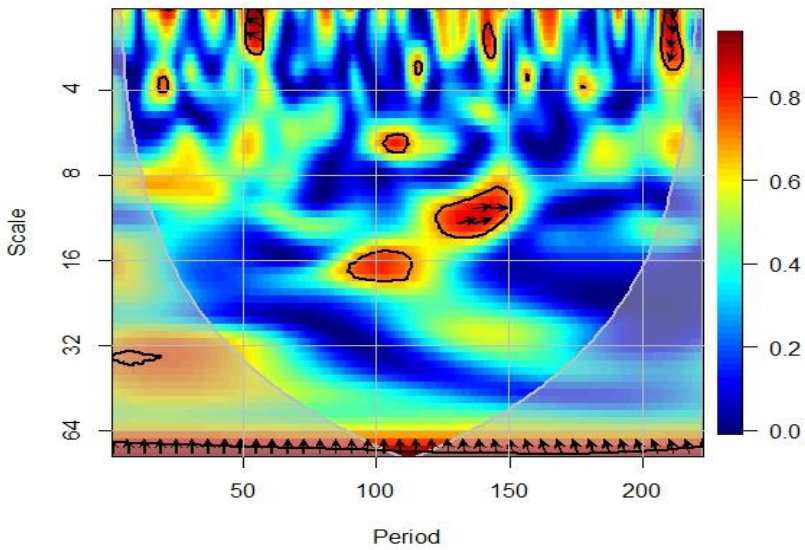
(a)

**Wavelet Coherence: Neutral Sentiment-S&P 500 Return**



(b)

**Wavelet Coherence: Negative Sentiment-S&P 500 Return**



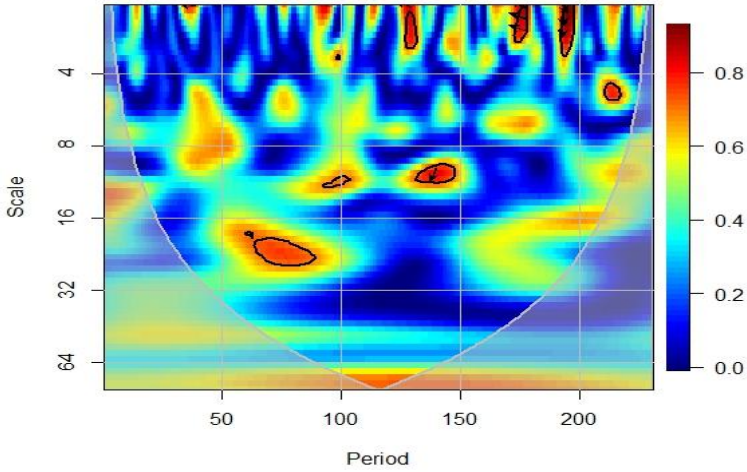
(c)

In addition, neutral sentiment has a positive and backward (positive and leading) co-movement with a return on 6/5/2020 to 13/5/2020 (2/11/2020 to 9/11/2020) on a 2-5 day (1-3 day) scales shown in dark red. On the other hand, there is a positive co-movement ( $\rightarrow$ ) between negative sentiment and return for the period 4/9/2020 to 5/10/2020 on 9-15-day scales with light red. Meanwhile, negative sentiment lagging ( $\downarrow$ ) was significant with return from 22/12/2020 to 7/1/2021 on 1-3 day scales as shown in dark red. This finding is consistent with Gjerstad et al. (2021) who documented that S&P 500 stocks reacted to Trump's tweets on the trade war topic with prices on the decline. Moreover, not only did the US economy face the consequences of lifting the tariffs but so too the international financial market (Bheenick et al. 2022). This indicates that a trade war generates an insecure investment atmosphere in the financial market. Yong Chen, Jing Fang and, Dingming Liu (2023) also discovered that the trade war shock produced an impact on the S&P 500 index mainly through news of the event which significantly influenced investors' investment decision.

The wavelet coherence analysis of trade war sentiment and MSCI China return, from 4/3/2020 (1 day) to 20/1/2021 (231 days), is described in Figure 2. The vertical axis is the frequency component and the horizontal axis shows the period. There is a significant negative co-movement and positive sentiment leads ( $\checkmark$ ) return, from 8/9/2020 to 29/9/2020 on 10-13 day scales, shown in red color. Furthermore, positive sentiment displays a negative co-movement ( $\leftarrow$ ) with a return from 27/10/2020 to 3/11/2020 on 1-2 day scales, shown in dark red. Neutral sentiment shows a significant positive and backward relationship ( $\searrow$ ) with returns at two different periods; from 12/5/2020 to 19/5/2020 on a 2-6 day frequency band with red color and, from 27/10/2020 to 3/11/2020 on 1-3 day scales, with dark red color. Next, there is a significant negative co-movement ( $\leftarrow$ ) between negative sentiment and return from 21/7/2020 to 4/8/2020 on 5-8 day scales, shown in dark red color. The result is consistent with Hasuike and Mehlawat (2018) who indicated that investors are typically risk-averse and try to avoid negative market downturns by diversifying asset portfolios. As such, public worry over the US-China trade war may have affected investments in Chinese stock markets.

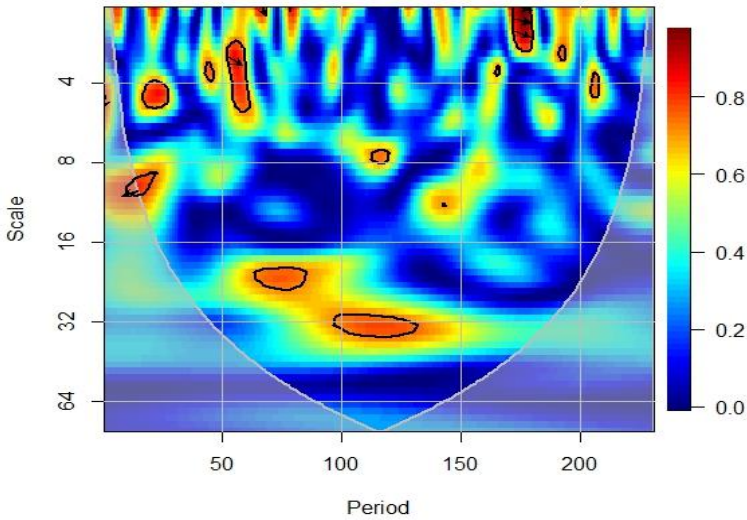
FIGURE 2  
Wavelet Coherence of Trade War Sentiments and MSCI China Return

**Wavelet Coherence: Positive Sentiment-MSCI China Return**



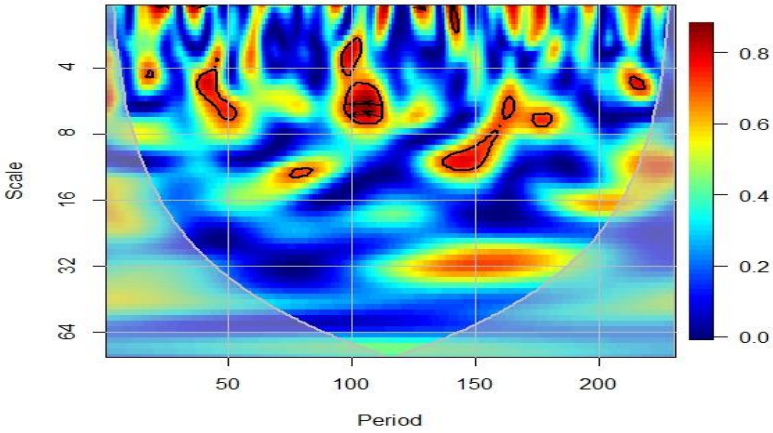
(a)

**Wavelet Coherence: Neutral Sentiment-MSCI China Return**



(b)

**Wavelet Coherence: Negative Sentiment-MSCI China Return**



(c)

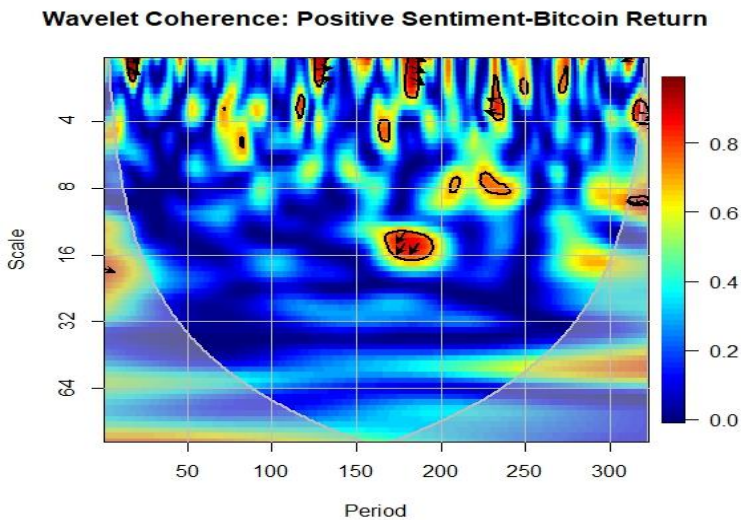
Figure 3 explains the wavelet coherence co-movement between trade war sentiment and Bitcoin return from the period 4/3/2020 (1 day) to 20/1/2020 (323 days). The vertical axis shows the frequency component and the horizontal axis illustrates the time period. There is a positive co-movement (→) positive sentiment and return from 13/3/2020 to 17/3/2020 on 1-2 day scales. The positive co-movement was similarly shown twice, on 11/7/2020 to 21/7/2020 and from 20/8/2020 to 25/8/2020 on 1-3 day scales. Conversely, we have a negative relationship (←) between the positive sentiment and return from 19/10/2020 to 24/10/2020 on a 2-4 day scale. All the stated movements are shown in black contours with dark red color which confirms that they strong at the 5% significance level. Although, there is a positive and negative co-movements between the stated time series, the positive co-movement is stronger than the latter and has a positive relationship at three different periods. Additionally, there is a negative co-movement and positive sentiment leads (↙) return from 21/8/2020 to 9/9/2020 on 12-16 day scales, shown as black contour filled with light red color indicating that the movement is modest at the 5% significance level.

In addition, there is a significant positive co-movement (→) between neutral sentiment and return from 22/4/2020 to 12/5/2020 on 32-40 day frequency cycles shown in light red color. Further, there is also neutral sentiment leads and negative co-movement ↙ (lagging ↓) with return for the period 16/6/2020 to 21/6/2020 (31/7/2020 to 8/11/2020) on 6-10 day (40-64 day) scales, given in light red color.

Apart from that, negative sentiment shows negative co-movement and leading ( $\swarrow$ ) with return from period 31/7/2020 to 10/8/2020 on 6-10 day scales in light red color. There is a positive relationship ( $\rightarrow$ ) between negative sentiment and return from 24/10/2020 to 29/10/2020 on a 1-3 day frequency band, in dark red color. However, the significance level of positive co-movement between negative sentiment and return is higher than that for the negative co-movement as indicated by the color intensity. This result is supported by Bouri et al. (2020) who showed a significant relationship between users' search interest in the trade war in Google and Bitcoin volatility. However, the authors only analyzed the overall user interest and didn't emphasize on users' perceptions of the trade war on Twitter, although Trump exclusively used the platform as the main channel to announce the news on trade policy. Huynh (2021) on the other hand had shown that negative sentiment found in 13, 918 tweets from Trump as a whole proved to be a predictive factor for the rate of return and volatility of Bitcoin. Nevertheless, Huynh (2021) only focused on the sentiments of Trump's tweets but did not take into account the importance of users' perceptions on policies specifically introduced by him.

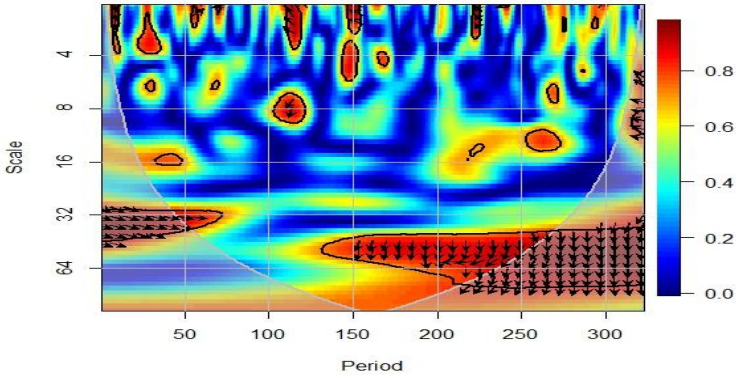
FIGURE 3

Wavelet Coherence of Trade War Sentiments and Bitcoin Return



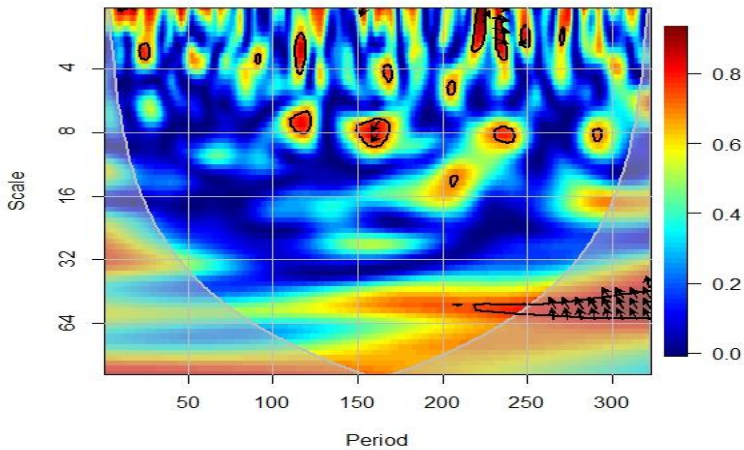
(a)

**Wavelet Coherence: Neutral Sentiment-Bitcoin Return**



(b)

**Wavelet Coherence: Negative Sentiment-Bitcoin Return**



(c)

## 5. CONCLUSION

This study elucidated the consequence of users’ sentiment regarding the trade war, using the Twitter social media, on the return of the S&P 500, MSCI China, and Bitcoin. Altogether, the findings have revealed that positive sentiment, neutral sentiment, and negative sentiment on the trade war have produced positive and negative co-movements with Bitcoin return at different periods. Besides this, the positive sentiment has a negative co-movement with the return of the S&P 500 and MSCI China. In addition, the neutral sentiment boosted the returns of both

stocks. On the other hand, negative sentiment has a positive (negative) co-movement with S&P 500 (MSCI China) returns. This finding is supported Burggraf et al. (2019) and Gjerstad et al. (2021) who documented empirical evidence that Trump's tweets on the trade war have implications for financial markets. Burggraf et al. (2019) reported that Trump's tweets affected the S&P 500 return negatively in the first lag and positively in the second lag. The financial market accordingly reacted to these tweets but changed in the following period. Hence, the effect of sentiment on the financial market is only temporary but it did react to user sentiment. The finding strengthens the results of some past studies (Alkhatib et al., 2020; Born et al., 2017; Bouri et al., 2020; Huynh, 2021; Ge et al., 2019). Ge et al. (2019) specifically revealed that there is a one-way relationship between Trump's tweets and the financial market, which is directed from the tweets to the markets. This study has thus established that user perceptions of trade war have an impact on stock markets and Bitcoin.

The recent study by Alkhatib et al. (2020) only examined user sentiment on the trade war but did not analyze the consequence of user perceptions on the financial markets. The US stock market furthermore tended to have a spillover effect on the stock markets of other countries (Georger, 2014; Zhang and Li, 2014); thus implementation of the policy will not only affect its domestic stock market but also has the potential to influence stock markets in other nations. Accordingly, US policymakers found that the tariff policy implementation produced a mixed result on Bitcoin return. Additionally, user sentiments showed a negative (positive) impact on the overall Chinese (US) stock market. This outcome indicates that the purpose of implementing the trade war policy has been achieved, which is to stimulate the US economic growth. Even though the positive sentiment has a negative effect on S&P 500 return, in reality most of the users harbor a negative feeling on the tariff policy especially those from countries adversely affected by the trade war. This was proven by Huynh (2019) who pointed out that Trump's tweets regarding tariffs triggered a huge loss to the global stock market.

Against this development, policymakers in the US and China should consider user perceptions of policy on Twitter platform, that policy implementation tends to indirectly influence investor behavior (Huerta et al., 2021). This is more apparent nowadays given that financial markets are easily influenced by current issues and

information announced on social media (Beckers, 2018). In addition, Xiaowei Kong et al. (2023) and Siriopoulos, Svingou, and Dandu (2021) maintained that policymakers have to understand the real reason for the fluctuation in stock market return in order to restabilize the market through taking the necessary action. By observing the user opinion on Twitter, the policymakers and government authorities may gain quick access on users' perceptions, via the Twitter platform, as related to the implementation of current government policies thus enabling them to identify extreme negative feelings that may lead to problematic situations or even acts of terrorism (Alkhatib et al., 2020).

The increasing facility of social media access by the public makes it easier for them to express their emotions and opinions on issues or government policies. Thus, monitoring public opinion expressed on social media can be considered an important initial step to problem solving. Through this means, policymakers have the potential to quickly react and galvanize the appropriate actions to problem solve. Furthermore, investors also need to diversify their investments during economic turmoil (Huynh and Burggraf, 2019), and as such they need to identify the stocks and assets that are ~~not~~ unaffected by prevailing financial crises. Moreover, such information can also be used by stockholders to formulate profitable investment strategies (Hasan, 2022). Evidently, psychological and sentiment elements can exert a big impact on investment decisions, in line with the behavioral science theory (Bheenick et al., 2022; Kraaijeveld and De Smedt, 2020). In consequence, Bitcoin and S&P 500 are positively affected by trade war sentiment during specific time period relative to the MSCI China. This study has empirically proven the relationship between user sentiments and the financial market. As such, investors cannot dismiss users' sentiment on Twitter as merely noise factor (Gjerstad et al., 2021).

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## ENDNOTES

1. Available at <https://www.statista.com/statistics/1100266/top-influential-twitter-users>.
2. Available at <https://coinmarketcap.com>.
3. Available at <https://data.bitcoinity.org/markets>.
4. Available at <https://bitinfocharts.com> and <https://trends.google.com>.
5. Available at <https://www.statista.com/topics/737/twitter> 2021.
6. Available at <https://www.statista.com/statistics/number-of-active-twitter-users-in-selected-countries>.
7. Available at <https://www.investing.com>.
8. Available at <https://rapidminer.com/educational-program>.
9. Available at <https://developer.twitter.com/en/docs/twitter-api>.
10. Available at <https://www.python.org>.

## REFERENCES

- AlKhatib, M., M. El Barachi, A. AleAhmad, F. Oroumchian, and K. Shaalan. "A Sentiment Reporting Framework for Major City Events: Case Study on the China-United States Trade War." *Journal Cleaner Production* 264, August (2020): 1-13.
- Anastasiou, D., A. Ballis, and K. Drakos. "Cryptocurrencies' Price Crash Risk and Crisis Sentiment." *Finance Research Letters* 42, October (2021): 101928.
- Baker, M., and J. Wurgler. "Investor Sentiment and The Cross-Section of Stock Returns." *The Journal of Finance* 61, no. 4 (2006): 1645-680.
- Birmingham, A., and A.F. Smeaton. "On Using Twitter to Monitor Political Sentiment and Predict Election Results." *Proceedings of the Workshop on Sentiment Analysis Where AI Meets Psychology (SAAIP)* (2011), 2-10.
- Beckers, S. "Do Social Media Trump News? The Relative Importance of Social Media and News Based Sentiment for Market Timing." *The Journal of Portfolio Management* 45, no. 2 (2018): 58-67.
- Bheenick, E.B., D. Hung, H. Xiaolu, and Z. Angel. "Sentiment and Stock Market Connectedness: Evidence from the U.S.-China Trade War." *International Review Financial Analysis* 80 (2022): 102031-02048.
- Born, J.A., D.H. Myers, and W.J. Clark. "Trump Tweets and The Efficient Market Hypothesis." *Algorithmic Finance* 6, no. 3-4 (2017): 103-09.

- Bouri, E., K. Gkillas, R. Gupta, and C. Pierdzioch. "Forecasting Realized Volatility of Bitcoin: The Role of the Trade War." *Computational Economics* 57, August (2020): 29-53.
- Bourghelle, D., F. Jawadi, and P. Rozin. "Do Collective Emotions Drive Bitcoin Volatility? A Triple Regime-Switching Vector Approach." *Journal of Economic Behavior & Organization* 196, no. 2 (2022): 294–306.
- Burggraf, T., R. Fendel, and T.L.D. Huynh. "Political News and Stock Prices: Evidence from Trump's Trade War." *Applied Economics Letters* 27, no. 18 (2019): 4851-488.
- Ding, D., G. Chong, C.M.L. Chan, and L. Wenting. "Building Stock Market Resilience through Digital Transformation: Using Google Trends to Analyze the Impact of COVID-19 Pandemic." *Frontiers of Business Research in China* 14, no. 21 (2020): 1-21.
- Dowling, M. "Is Non-Fungible Token Pricing Driven by Cryptocurrencies?" *Finance Research Letters* 44, January (2022): 102097-0103.
- Elbagir, S., and Y. Jing. "Language Toolkit and VADER Sentiment." *Proceedings of the International Multi Conference of Engineers and Computer Scientists (IMECS)* 0958 (2019): 12–16.
- Fama, E.F. "Efficient Capital Markets: A Review of Theory and Empirical Work." *The Journal Finance* 25, no. 2 (1970): 383–417.
- Fuller, W.A. *Introduction to Statistical Time Series*. John Wiley and Sons, New York. 2009.
- Garcia, D., C.J. Tessone, P. Mavrodiev, and N. Perony. "The Digital Traces of Bubbles: Feedback Cycles between Socio-Economic Signals in the Bitcoin Economy." *Journal of the Royal Society Interface* 11 (2014): 20140623-0140631.
- Ge, Q., A. Kurov, and M.H. Wolfe. "Do Investors Care about Presidential Company-Specific Tweets?" *Journal of Financial Research* 42, no. 2 (2019): 213–42.
- George, Y.L. "The Interactions between China and US Stock Markets: New Perspectives." *Journal of International Financial Markets, Institutions and Money* 31, July (2014): 331–42.
- Gjerstad, P., P.F. Meyn, and P. Molnár, and T.D. Næss. "Do President Trump's Tweets Affect Financial Markets?" *Decision Support Systems* 147, no. 20 (2021): 1–19.
- Grinsted, A., J.C. Moore, and S. Jevrejeva. "Application of the Cross Wavelet Transform and Wavelet Coherence to Geophysical

- Time Series.” *Nonlinear Process Geophys* 11, 5/6 (2004): 561-66.
- Goodell, J.W., and S. Goutte. “Co-Movement of COVID-19 and Bitcoin: Evidence from Wavelet Coherence Analysis.” *Finance Research Letters* 38, January (2021): 101625-01631.
- Hasuike, T., and M.K. Mehlawat. “Investor-Friendly and Robust Portfolio Selection Model Integrating Forecasts for Financial Tendency and Risk-Averse.” *Annals of Operations Research* 269 (2018): 205-21.
- He C., C. Rui, L. Ying. “US-China Trade War and China’s Stock Market: An Event-Driven Analysis.” *Economic Research-Ekonomska Istrazivanja* 35, no. 1 (2022): 3277-290.
- Hutto, C.J., and E. Gilbert. “VADER: A Parsimonious Rule-Based Model for Sentiment Analysis of Social Media Text.” *Proceedings of the 8th International Conference on Weblogs and Social Media, ICWSM* (2014): 216–25.
- Huerta, D.T., J.B. Hawkins, J.S. Brownstein, and Y. Hswen. “Exploring Discussions of Health and Risk and Public Sentiment in Massachusetts during COVID-19 Pandemic Mandate Implementation: A Twitter Analysis.” *SSM - Population Health* 15, September (2021): 100851-00860.
- Huynh, T.L.D., and T. Burggraf. “If Worst Comes to Worst: Co-Movement of Global Stock Markets in the US-China Trade War.” *Economics and Business Letters* 9, no. 1 (2020): 21-30.
- \_\_\_\_\_. “Does Bitcoin React to Trump’s Tweets?” *Journal of Behavioral and Experimental Finance* 31, September (2021): 100546-00556.
- Kahneman, D., and A. Tversky. “Prospect Theory: An Analysis of Decision under Risk.” *Econometrica* 47, no. 2 (1979): 263-91.
- Kraaijeveld, O., and J. De Smedt. “The Predictive Power of Public Twitter Sentiment for Forecasting Cryptocurrency Prices.” *Journal of International Financial Markets, Institutions and Money* 65, March (2020): 101188-01199.
- Hasan, M.T. “The Sum of All Scares Covid-19 Sentiment and Asset Return.” *The Quarterly Review of Economics and Finance* 86 (2022): 332-46.
- Öztürk, S.S., and M.E. Bilgiç. “Twitter & Bitcoin: Are the Most Influential Accounts Really Influential?” *Applied Economics Letters* 29, no. 11 (2021): 1001-004.

- Plakandaras, V., E. Bouri, and R. Gypta. "Forecasting Bitcoin Returns: Is There a Role for the US– China Trade War?" *Journal of Risk Research* 23, no. 3 (2019): 1-20.
- Ranco, G., D. Aleksovski, G. Caldarelli, M. Grcar, and L. Mozetic. "The Effects of Sentiment on Stock Price Returns." *Plos One* 10, no. 9 (2015): 1-21.
- Raja Solan, S., F.S. Fathin, S. Tamat, and Y. Mohd Ridzwan. "Impact of Twitter and Google Searches on Bitcoin Rate of Return." *Jurnal Ekonomi Malaysia* 57, no. 3 (2023a): 1-15.
- \_\_\_\_\_, F.S. Fathin, S. Tamat, and Y. Mohd Ridzwan. "Effect of Covid-19 Sentiment on Financial Markets: Evidence from S&P 500 and Bitcoin." *Jurnal Ekonomi Malaysia* 57, no. 2 (2023b): 1-15.
- Reis, P.M.N., and C. Pinho. "COVID-19 and Investor Sentiment Influence on the US and European Countries Sector Returns." *Investment Management and Financial Innovations* 17, no. 3 (2020): 373-86.
- Rua, A., and L.C. Nunes. "International Co-Movement of Stock Market Return: A Wavelet Analysis." *Journal of Empirical Finance* 16, no. 4 (2009): 632-39.
- Shleifer, A., and R. Vishny. "The Limits of Arbitrage." *The Journal of Finance* 52, no. 1 (1997): 35-55.
- Siriopoulos, C., A. Svingou, and J. Dandu. "Lessons for Euro Markets from the First Wave of COVID-19." *Investment Management and Financial Innovations* 18, no. 1 (2021): 285–98.
- Soudeep, D. "Analyzing Airlines Stock Price Volatility during COVID-19 Pandemic through Internet Search Data." *International Journal of Finance & Economics* (2021): 1-17.
- Sprenger, T.O., A. Tumasjan, P.G. Sandner, and I.M. Welpe. "Tweets and Trades: The Information Content of Stock Microblogs." *European Financial Management* 20, no. 5 (2014): 926–57.
- Thaler, R. "Toward a Positive Theory of Consumer Choice." *Journal of Economic Behavior & Organization* 1, no. 1 (1980): 39-60.
- Torrence, C., and G.P. Compo. "A Practical Guide to Wavelet Analysis." *Bulletin of the American Meteorological Society* 79, 1 (1998): 61-78.
- \_\_\_\_\_, and P.J. Webster. "Interdecadal Changes in the ENSO-Monsoon System." *Journal of Climate* 12, no. 8 (1999): 2679-690.
- Tsiaplidas, S., and W. Jiao. "The Australian Economy in 2019–20: Slower Growth, Record Low Interest Rates and a Changing

- Housing Landscape.” *Australian Economic Review* 53, no. 1 (2020): 5-21.
- Valencia, F., A. Gómez-Espinosa, and B. Valdés-Aguirre. “Price Movement Prediction of Cryptocurrencies Using Sentiment Analysis and Machine Learning.” *Entropy* 21, no. 6 (2019): 589-601.
- Xiaofan P. “Do Precious Metals Act as Hedges or Safe Havens for China’s Financial Markets?” *Finance Research Letters* 37, November (2019): 101353-01363.
- Xiaowei, K., J. Yifan, L. Lihua, and X. Jialu. “Firms’ Exposures on COVID-19 and Stock Price Crash Risk: Evidence from China.” *Finance Research Letters* 52 (2023): 103562-03570.
- Yong C., J. Fang, and D. Liu. “The Effects of Trump’s Trade War on U.S. Financial Markets.” *Journal of International Money and Finance* 134 (2023): 102842-02866.
- Yuexin, M., W. Wei, W. Bing, and L. Benyuan. “Correlating S&P 500 Stocks with Twitter Data.” *Proceedings of the First ACM International Workshop on Hot Topics on Interdisciplinary Social Networks*, August (2012): 69-72.
- Yujie Shi, Liming Wang, and Jian Ke. “Does the US-China Trade War Affect Co-Movements between US and Chinese Stock Markets?” *Research in International Business and Finance* 58 (2021): 101477-01493.
- Zhang, Y.Z., and Y.Y. Li. “Inflammatory Bowel Disease: Pathogenesis.” *World Journal of Gastroenterology* 20, 1 (2014): 91-9.



## **THE IMPORTANCE-PERFORMANCE MAP ANALYSIS OF PERFORMANCE-BASED PAY MANAGEMENT AND PROCEDURAL JUSTICE IN MALAYSIAN GOVERNMENT-LINKED COMPANY**

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### **ABSTRACT**

Performance-based pay management (PBPM) is a strategic approach in human resource management to achieve organizational sustainability in a competitive business landscape. This research aimed at assessing the relationship between PBPM's components (i.e. communication, participation, and performance evaluation) and procedural justice, and to evaluate the importance and performance of each element using Importance-Performance Map Analysis (IPMA). A cross-sectional approach was used to collect usable data through questionnaire survey on 400 employees from Malaysian Government-Linked Companies. SmartPLS software version 4 was used to analyze the survey data. Consistent PLS-SEM Bootstrapping analysis indicates three important findings. First, the relationship between communication and procedural justice was significant. Second, the relationship between participation and procedural justice was non-significant. Lastly, the relationship between performance appraisal and procedural justice was significant. Further, IPMA analysis indicates that performance evaluation is the most critical and well-executed component, followed by communication, and participation. This study provides empirical evidence on the importance of effective communication, participation, and systematic performance evaluation in managing performance-based pay to enhance employee perception of procedural justice. The findings of this study contribute significant insights to the theory, research methodology,

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practitioner, and social aspects of Performance-based Pay Management (PBPM).

JEL Classification: M12

Keywords: Performance-based pay management, Procedural justice, Communication, Participation, Performance evaluation

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## 1. INTRODUCTION

Performance-based pay management (PBPM) is a strategic approach in human resource management that ties employee compensation directly to their performance (Ulfsdotter, Larsson, and Adolfsson, 2021). This system aims to align employees' incentives with organizational goals, thereby driving higher productivity, motivation, and overall performance (Kryscynski, Coff, and Campbell, 2021). PBPM includes various practices such as merit-based pay raises, bonuses, and other forms of performance-related compensation designed to reward employees who contribute most significantly to the organization's success (Sutrisno and Muslim, 2024). By directly linking pay to performance, organizations seek to create a more dynamic and responsive workforce that is motivated to achieve higher levels of efficiency and effectiveness.

Procedural justice refers to the perceived fairness of the processes used to make decisions within an organization. It encompasses the methods and practices through which outcomes are determined, ensuring that they are unbiased, consistent, transparent, and based on accurate information (Colquitt, Hill, and De Cremer, 2023). Procedural justice is crucial in fostering a sense of fairness among employees, which in turn can enhance their commitment, satisfaction, and trust in the organization (Pathardikar, Mishra, and Sahu, 2023). When employees believe that the procedures used to evaluate their performance and determine their compensation are fair, they are more likely to exhibit positive attitudes and behaviors, such as higher job satisfaction and organizational commitment.

The connection between PBPM and procedural justice is significant, as the effectiveness of performance-based pay systems (PBPS) largely depends on employees' perceptions of fairness in the procedures used to evaluate and determine the type and the amount of pay (Shah and Jabeen, 2021). When employees perceive the process

as just, they are more likely to accept the outcomes, even if they are not entirely favorable (Newman, Fast, and Harmon, 2020). This acceptance can lead to increased motivation and engagement, reinforcing the positive effects of PBPM. Conversely, if the processes are perceived as unfair, it can lead to dissatisfaction, reduced motivation, and even counterproductive work behaviors (De Clercq et al., 2021).

The recent literature on PBPM and procedural justice highlighted several challenges. In many organizations, the processes for determining employee pay are not always transparent or consistent, leading to perceptions of bias and unfairness (Ugarte and Rubery, 2021). Such issues can undermine the intended benefits of PBPM, resulting in decreased employee morale and productivity. Additionally, the complexity of accurately measuring performance in various job roles further complicates the implementation of fair pay management practices (Bajaj, 2021). For instance, subjective performance evaluations can be influenced by personal biases, while objective metrics may not fully capture the discrepancies of different job functions. Therefore, the objectives of this research are to assess the relationship between PBPM's components (i.e. communication, participation, and performance evaluation) and procedural justice, and to evaluate the importance and performance of each component using Importance-Performance Map Analysis (IPMA). This analytical approach will provide a comprehensive understanding of which components of PBPM are most critical to enhancing procedural justice and where improvements are needed.

This study is expected to contribute significantly to both theoretical and practical aspects of human resource management. Theoretically, it will enhance the understanding of how PBPM influences procedural justice and employee perceptions of fairness (Hardwicke et al., 2023). Practically, the findings will provide actionable insights for human resource practitioners and organizational leaders to design and implement more effective and fair performance-based pay systems (Park et al., 2021). By identifying the most important components of PBPM and evaluating employee performance, organizations can make targeted improvements that foster a more motivated and engaged workforce, ultimately leading to better organizational outcomes.

## 2. LITERATURE REVIEW

### 2.1 PERFORMANCE-BASED PAY MANAGEMENT

Performance-based pay management (PBPM) has gained significant prominence in recent years as organizations continuously seek innovative ways to align employee incentives with their overarching strategic goals. By linking pay directly to performance outcomes, this approach aims at motivating employees to reach higher levels of productivity and efficiency. According to Ulfsdotter et al. (2021), the fundamental premise of PBPM is that financial rewards are tied to actual employee performance. This situation can drive employees to perform better and contribute more effectively to organizational success.

However, the effectiveness of a PBPS extends beyond the mere provision of financial rewards. While financial rewards are a key component, the perceived fairness of the evaluation and compensation processes plays an equally, if not more, critical role. As Rasheed et al. (2020) highlighted, employees' perceptions of fairness significantly influence their motivation and overall job satisfaction. If employees believe that the processes for evaluating their performance and determining their rewards are biased or opaque, the motivational benefits of financial rewards can be substantially diminished.

For a PBPS to be truly successful, it must ensure that the criteria and processes for performance evaluation are transparent, consistent, and equitable. Employees need to understand how their performance is measured and how it directly impacts their compensation. This transparency helps build trust in the system and reassures employees that their efforts will be fairly recognized and rewarded (Brown et al., 2022). For instance, detailed performance metrics should be communicated clearly to all employees, along with regular feedback sessions to discuss their progress and areas for improvement. This level of clarity and openness can significantly enhance employees' perceptions of procedural justice (Ha and Moon, 2023).

Moreover, the evaluation process must be consistent across all levels of the organization to prevent any perceptions of favoritism or bias. Standardized evaluation criteria and regular calibration sessions among managers can help ensure that all employees are assessed on a level playing field. When employees see that everyone is held to the same standards, it fosters a sense of fairness and equity, which is

crucial for maintaining high levels of morale and motivation (Purandare and Kumar, 2021).

In addition to transparency and consistency, the perceived equity of the compensation process is also vital. Employees need to feel that their compensation reflects their performance accurately. This involves not only fair base pay but also equitable distribution of bonuses and other performance-related rewards. Organizations should regularly review their compensation policies to ensure that they remain competitive and fair, taking into account market trends and internal equity (Kang and Lee, 2021).

Understanding how these processes are perceived by employees is critical for enhancing organizational effectiveness. When employees feel that their hard work and contributions are fairly evaluated and rewarded, they are more likely to be engaged, motivated, and committed to their roles. This, in turn, can lead to higher levels of productivity, lower turnover rates, and a more positive organizational culture (Murtiningsih, 2020).

Although financial incentives are an important aspect of PBPM, their success hinges on the perceived fairness of the evaluation and compensation processes. By ensuring transparency, consistency, and equity in these processes, organizations can enhance employee motivation and satisfaction, ultimately leading to improved organizational performance.

## 2.2 COMMUNICATION

Effective communication is a very important aspect of PBPM as it ensures that employees understand the criteria, the processes, and the reasons for performance evaluation and pay decisions. Sahay and Kaur (2021) point out that clear communication helps employees know what is expected of them and how performance will be appraised. This is a vital understanding that aligns and connects employees with organizational objectives and creates a sense of ownership and responsibility.

Transparent communication implies the frequency with which employees are updated concerning the standards used during performance appraisal (Sahay and Kaur, 2021). Through detailed explanations of how performance is measured and how these measurements affect decisions regarding pay, it builds trust and

credibility for an organization (Amini and Kemal, 2021). This will enable the employee to understand what criteria affect his or her pay and hence regard the evaluation process as fair and unbiased.

Consistency in communication is also very important. Consistent messages from management indicate that the information being given out is reliable. Such a communication is free or less subject to perceived biases or favoritism that would mostly take place in case the provision of information is done consistently or sporadically. Frequent and consistent communication means that all employees receive the same information at the same time, therefore, understanding the performance evaluation process uniformly (Brown et al., 2022).

Besides, effective communication will promote a culture of feedback and continuous improvement. The organizations can encourage employees to ask questions, seek clarifications, and provide feedback by setting open channels of communication. Such a two-way communication process can help in identifying and overcoming any concerns the employees might have in relation to the evaluation process, ensuring procedural justice at the highest level possible (Milesi, 2022). The feedback sessions can also shed light on the requirements to make the performance-based pay system more efficient for the organization and the employees.

This communication can also be customized to suit the different nature of workers in the organization. Different workers have different levels of understanding and are familiar with the performance-based pay system (Ulfsdotter et al., 2021). By using a number of different communication channels and methodologies all employees, irrespective of their position or background, can be reached and understand the information (Deepa and Baral, 2022). This may be in the form of emails, newsletters, workshops, and one-to-one sessions.

Ultimately, performance-based pay management communication effectiveness lies not only in informing but also in an environment that assures the employees of being informed, valued, and involved. If evaluation processes in matters of compensation are made transparent and fair, employees will equate this to trust developed within the organization. Trust further translates into heightened motivation, job satisfaction, and hence overall performance. The end result is a harmonious workplace with increased productivity (Tse, 2023).

### 2.3 PARTICIPATION

The other pillar of effective pay management based on performance is participation in decision-making processes. This feature gives the employee a say in those matters that most affect his or her way of working and how he or she will be paid, increasing ownership, commitment, and fairness (Strine and Smith, 2020). According to Van et al. (2021), when employees are given opportunities to participate, it results in their feeling valued and respected, and hence builds satisfaction and engagement at work.

A significant and successful way that leads to this end is when employees are involved in setting performance goals. The employee gains a better understanding of what is expected of them through this collaboration with management in setting performance objectives (Salas-Vallina, Alegre, and López-Cabrales, 2021). This goal-setting, collaboratively set, assures realistic and achievable goals that are aligned with employee capability and organizational strategy (Van, 2020). This is because participation means employees will tend to agree more with the goals because they had a role in setting them.

Employee evaluation of performance outcomes enhances feelings of fairness and justice. Employees should be invited to contribute in setting of the criteria for appraising themselves and also getting an opportunity to provide feedback on their performance (Varma et al., 2020). This involvement helps to create a more transparent and objective appraisal process, thus reducing the opportunity for biases and misconceptions (Hardwicke and Wagenmakers, 2023). Those employees who are involved in such evaluations will view this as a fair means of appraisal since they get a chance to air their views and influence the results.

Furthermore, participative decision-making creates a culture of trust and teamwork within the organization (Silla, Gracia, and Peiró, 2020). Employees are more willing to place their trust in management and be loyal to an organization that takes into consideration and values their opinions. This creates trust and a supportive working environment under which staff feel at liberty and motivated to give their best.

Participation also has potential for generating better outcomes in decision-making. Those involved in doing the direct work may have better insights and perspectives which the management tends to

overlook. In this regard, participative decision-making through employee feedback and suggestions in the decision-making process would lead to more informed and effective decisions that are probable to develop higher performance and productivity in organizations (Galeazzo, Furlan, and Vinelli, 2021).

Thereby, employee participation in the decision-making process is an essential ingredient of pay management based on performance. This increases employees' feeling of ownership and fairness, their trust and collaboration, and eventually organizational results. Organizations can increase their level of procedural justice by encouraging a participative culture, thus creating a more motivated and engaged workforce.

## 2.4 PERFORMANCE EVALUATION

Performance evaluation is a critical component of performance-based pay management, involving the systematic assessment of employee performance against established criteria. This process is essential for ensuring that performance-based pay management is both effective and just. Accurate performance evaluations are foundational to the integrity of performance-based pay systems, as they provide the basis for determining compensation and other rewards (Jamaiudin, 2021).

Organizations should develop clear, objective, and relevant criteria to reflect the real duties and of the employees. The criteria should be developed from the strategic goals of the organization and differentiated across responsibilities roles and functions that are different from one organization to another (Wong, 2020). In this way, it would be possible to put in place a method by which evaluation could measure employee contributions and performance outcomes in a realistic way.

Likewise, there should be consistency in performance appraisals. Employees must be evaluated uniformly to avoid bias and ensure fair evaluations (Chan, 2024). This means that the same standards and criteria need to be applicable to each employee regardless of position or tenure. Regular training on how to apply such criteria fairly can maintain consistency among the managers and evaluators (Ibarra-Sáiz, Rodríguez-Gómez, and Boud, 2020). Moreover, such tools and evaluation processes standardized also could improve consistency and reliability.

Thus, performance evaluations are key determinants in making pay management performance-sensitive so that pay decisions mirror true employee performance. By underlining accuracy,

consistency, and transparency, fair appraisals will be held that support procedural justice and improve overall employee satisfaction and motivation.

## 2.5 PROCEDURAL JUSTICE

Procedural justice, anchoring the theory of organizational justice, is the fairness of processes by which decisions are made and resources are allocated in an organization (Rueda et al., 2024). Procedural justice, being practiced, emphasizes the fair methods and practices leading to these outcomes. As argued by the procedural justice theory, employees are more likely to accept and support the outcomes of decisions they perceive to have a fair procedural process, whether the outcome is favorable or unfavorable to the employees concerned (Newman et al., 2020). Such a perception is important in engendering employee trust, commitment, and positive work attitudes.

Key elements of procedural justice include consistency, bias suppression, accuracy, correctability, representativeness, and ethicality. Consistency implies that the rules and procedures applied are used equally on all subjects. Suppression of bias eliminates personal bias and prejudice in decision-making and ensures decisions are objective and made based on relevant criteria. The term accuracy means being based on good information with some amount of analysis, and correctability means the availability of a means to address the wrongs or injustices that are inevitably made in decision-making (Vosen, 2021). When employees feel there is procedural justice within organizations, they will have a high level of commitment to organizations, be satisfied with their jobs, and in a general way, perform at work. This is because the employees feel respected, esteemed, and appreciated, thereby being motivated to reciprocate with positive behaviors and attitudes at work.

Therefore, procedural justice is one of the dimensions of organizational justice with regard to the fairness of the processes used in reaching decisions. If consistency, bias, correctness, correctability, representativeness, and ethicality can be guaranteed with respect to fairness, then the view of the employees is bound to be affected, making it possible to have a more committed, satisfied, and hence productive workforce.

## 2.6 THE RELATIONSHIP BETWEEN COMMUNICATION AND PROCEDURAL JUSTICE

Procedural justice is greatly enhanced through effective communication, particularly in the context of performance-based pay management. Recent empirical studies tend to furnish the same with crucial support. For example, clear and open communication regarding criteria for performance appraisal and pay decisions significantly enhances perceived levels of procedural justice on part of employees themselves. The research has shown that when employees are aware of the process and criteria by which their performance will be reviewed, the processes tend to be seen as fair. Further, according to De Clercq and Pereira (2023), consistent and transparent communication helps to reduce uncertainty and ambiguity among employees. It enhances a sense of fairness and trust in organizational procedures. The study also uncovers that higher perceived procedural justice can be attained when employees are informed of all changes in the assessment procedures and changes in criteria constantly and in a timely manner. Also, Pichler, Beenen, and Wood (2020) highlight one critical factor, two-way communications; they believe that if employees can ask questions and respond to the performance appraisal, it would make them view it as being fair. This kind of engagement ensures that procedural justice becomes more prevalent for employees, and they feel their voices are heard and valued. The evidence from the empirical study thus gives weight to the importance of effective communication in fostering procedural justice for performance-based pay management. Clear, transparent, and two-way communication is reassuring and reduces uncertainty, as well as being aligned with key theoretical frameworks highlighting the importance of good communication to shape perceptions of fairness. Thus, it was hypothesized that:

H1: There is a significant relationship between communication and procedural justice.

## 2.7 THE RELATIONSHIP BETWEEN PARTICIPATION AND PROCEDURAL JUSTICE

Procedural justice is significantly influenced by participation in decision-making processes, especially when it comes to performance-based salary management. The association between employee engagement and perceptions of procedural justice is well supported by recent empirical research. Rasheed et al. (2020) found that employees'

opinion of fairness is greatly improved when they are involved in creating performance goals and reviewing outcomes. According to their research, workers who took part in these procedures were more likely to think that the performance-based pay structure was fair and just. Additional research by Govender and Bussin (2020) showed that employees' engagement and trust are increased when they participate in decision-making processes. The results of their study showed that employees become more engaged when they are given the opportunity to contribute to decisions that impact their job and pay. This is because they come to trust that organizational procedures are fair. Furthermore, the Porumbescu, Piotrowski, and Mabillard (2021) study clarified that participation lessens the impression of bias in performance reviews. Involving employees in the review process increases the likelihood that they will view the results as impartial and fair, which is essential for procedural fairness. Thus, in the context of performance-based pay management, the relationship between employee engagement and procedural justice is substantially supported by empirical evidence. Participation in decision-making processes improves feelings of empowerment, fairness, and trust which are critical for preserving procedural justice. Thus, it was hypothesized that:

H2: There is a significant relationship between participation and procedural justice.

## 2.8 THE RELATIONSHIP BETWEEN PERFORMANCE EVALUATION AND PROCEDURAL JUSTICE

An essential part of performance-based pay management is performance evaluation, which has a strong empirical background supporting its connection to procedural justice. Employee perceptions of procedural justice are greatly influenced by the efficacy and fairness of performance reviews. This, in turn, affects employees' motivation, job satisfaction, and general organizational commitment. According to a study by Tran, Lepistö, and Järvinen (2021), fair and accurate performance evaluation are essential to procedural justice. The study's findings indicate that employees are more likely to view the evaluation process as just and fair when it is founded on precise, objective criteria. Their belief in the organization's fairness and its management

techniques is strengthened by this perspective. Rubin and Edwards (2020) emphasize how crucial consistency is when assessing performance. According to their findings, appraisal procedures that are implemented consistently to every employee lessen the perception of bias and partiality. Procedural fairness requires that all employees believe they are being evaluated fairly, and this uniformity is crucial to achieving that goal. A study by Tran et al. (2021) found that employees' perceptions of procedural justice are greatly improved by open communication regarding the performance review process. According to the study, employees are more likely to believe in the process and think it is fair if they are aware of the evaluation criteria and how their performance will be evaluated. These results demonstrate that, in the context of performance-based pay management, empirical data clearly supports the link between procedural justice and performance appraisal. To sustain high levels of employee motivation and engagement, perceptions of fairness and trust must be fostered through accurate, open, and consistent performance evaluation. Thus, it was hypothesized that:

H3: There is a significant relationship between performance evaluation and procedural justice.

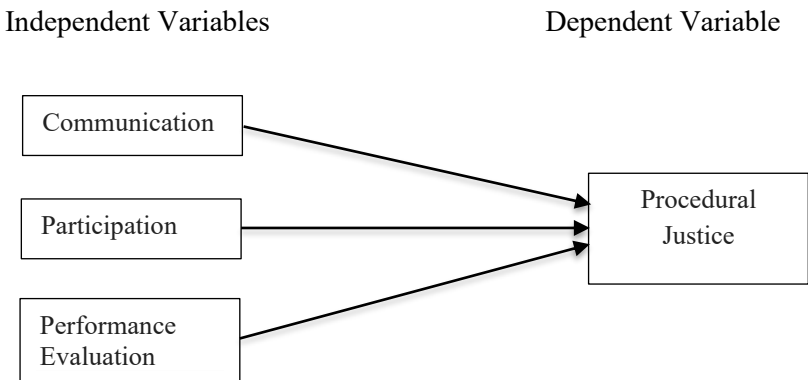
## 2.9 CONCEPTUAL FRAMEWORK

Figure 1 presents the conceptual framework of the study, which illustrates the relationship between the independent variables and the dependent variable. The framework is grounded in Procedural Justice Theory, which emphasizes employees' perceptions of fairness in organizational processes and decision-making. In this study, communication, participation, and performance evaluation are identified as the independent variables representing the components of Performance-Based Pay Management (PBPM), while procedural justice serves as the dependent variable.

The framework proposes that effective communication, employee participation, and fair performance evaluation practices positively influence employees' perceptions of procedural justice within Malaysian Government-Linked Companies (GLCs). Communication refers to the clarity and transparency of information related to PBPM practices. Participation reflects the extent to which employees are involved in decision-making processes concerning performance-based pay, whereas performance evaluation concerns the fairness and accuracy of assessing employees' work performance.

Furthermore, the framework supports the objective of this study, which is to examine the relationship between PBPM components and procedural justice, as well as to evaluate the importance and performance of each component using Importance-Performance Map Analysis (IPMA). The directional arrows in the framework indicate that each PBPM component is expected to contribute directly to procedural justice perceptions among employees.

FIGURE 1  
Research Conceptual Framework



### 3. RESEARCH METHODOLOGY

#### 3.1 RESEARCH APPROACH

This study employed a cross-sectional research approach which allows the researchers to integrate the PBPM literature and the actual survey to collect data for this study. According to Creswell (2015) and Sekaran and Bougie (2016), using this data collection procedure may help the researchers to gather accurate data, decrease bias and increase quality of data being collected. This study was conducted at Malaysian Government-Linked Companies. At the initial stage of this study, the questionnaire was developed based on the PBPM literature. Further, a

back-to-back translation technique was employed to translate the survey questionnaires. Thus, there are English and Malay versions in order to increase the validity and reliability of research findings (Creswell, 2015; Sekaran and Bougie, 2016).

### 3.2 MEASURES

The survey questionnaire used in this study consists of four components. First, communication has 11 items adapted from Azman, Mohd Sani, and Mohamad Mahmood (2014) and Marasi (2014). Second, participation has 10 items adapted from Milkovich et al. (2014). Third, performance evaluation has 13 items adapted from Thurston and McNall (2010). Finally, procedural justice has six items adopted from the Lambert et al. (2020). All these items were measured using a 7-item scale ranging from “strongly disagree/dissatisfied” (1) to “strongly agree/satisfied” (7).

### 3.3 SAMPLE

A convenient sampling technique was employed to collect 400 usable data from employees of the selected organization. This sampling technique was applied because the management of the organization had not given the list of registered employees to the researchers and this situation has prevented the researchers from utilizing a random technique in choosing respondents for this study. The participants gave their consent prior to answering the survey questions, and it was on a voluntary basis.

### 3.4 DATA ANALYSIS

SmartPLS software version 4 was used to assess the validity and reliability of the instrument and test the research hypotheses. The main advantage of using this method is because it may provide latent variable scores, avoid small sample size problems, estimate every complex model with many latent and manifest variables, hassle stringent assumptions about the distribution of variables and error terms, and handle both reflective and formative measurement models (Hair et al., 2017). The SmartPLS path model was employed to assess the path coefficients for the structural model using the standardized beta ( $\beta$ ), t-statistics, and p-value. The value of  $R^2$  was used as an indicator of the overall predictive strength of the model. The value of  $R^2$  is interpreted as follows: 0.02 (weak), 0.13 (moderate), and 0.26 (substantial) (Cohen, 1988). Next, the Important-Performance Map

Analysis (IPMA) as suggested by Hair et al. (2017) was employed to ascertain the importance and performance of each component in PBPM toward enhancing the perception of procedural justice among employees in the studied organization.

## 4. RESEARCH FINDINGS AND DISCUSSION

### 4.1 RESPONDENT CHARACTERISTICS

The majority of the respondents are male, constituting 84.8% of the sample, while females make up 15.3%. Most respondents are married, accounting for 86.8%, while 13.3% are single. The majority of respondents work at branch offices (71.8%), followed by state offices (22.0%) and headquarters (6.3%). A large portion of the respondents (75.0%) have completed MCE/SPM, with smaller percentages holding higher educational qualifications. The age distribution is skewed toward the younger demographic, with nearly half (49.8%) of the respondents aged 25-34 years. The majority of respondents belong to the non-executive group, making up 77.2% of the sample, whereas the executive group comprises 22.8%.

### 4.2 CONVERGENT VALIDITY TEST

Table 1 presents the findings of convergent validity test. The construct communication has outer loadings ranging from 0.704 to 0.807, a Cronbach's alpha of 0.933, composite reliability of 0.934, and an average variance extracted (AVE) of 0.561. This indicates good internal consistency and acceptable convergent validity, as the AVE exceeds the 0.50 threshold. The participation construct shows outer loadings between 0.719 and 0.907, with a Cronbach's alpha of 0.953, composite reliability of 0.955, and an AVE of 0.670, reflecting high internal consistency and strong convergent validity. For performance evaluation, outer loadings range from 0.703 to 0.869, with a Cronbach's alpha of 0.961, composite reliability of 0.962, and an AVE of 0.655, indicating very high reliability and good convergent validity. Lastly, procedural justice exhibits outer loadings between 0.839 and 0.888, a Cronbach's alpha of 0.945, composite reliability of 0.945, and an AVE of 0.740, demonstrating excellent internal consistency and

convergent validity. These findings affirm that the constructs used in the study are both reliable and valid, ensuring the robustness of the measurement model.

TABLE 1  
The Convergent Validity Test Findings

Constructs	Outer Loading	Cronbach's alpha	Composite reliability	Average variance extracted (AVE)
Communication	0.704 – 0.807	0.933	0.934	0.561
Participation	0.719 – 0.907	0.953	0.955	0.670
Performance Evaluation	0.703 – 0.869	0.961	0.962	0.655
Procedural Justice	0.839 – 0.888	0.945	0.945	0.740

#### 4.3 DISCRIMINANT VALIDITY TEST

Table 2 presents the findings of discriminant validity test. The Heterotrait-Monotrait ratio (HTMT) values indicate the ratio of between-construct correlations to within-construct correlations, providing a more stringent assessment of discriminant validity. The HTMT value between Communication and Participation is 0.780, between Communication and Performance Evaluation is 0.764, and between Communication and Procedural Justice is 0.712. The HTMT value between Participation and Performance Evaluation is 0.761, and between Participation and Procedural Justice is 0.663. Lastly, the HTMT value between Performance Evaluation and Procedural Justice is 0.769. To establish discriminant validity, HTMT values should be below the threshold of 0.90, and ideally below 0.85, as values above these thresholds suggest a lack of discriminant validity. In this analysis, all HTMT values are below the threshold of 0.90, indicating that discriminant validity is established for all constructs. This demonstrates that each construct is distinct and measures different aspects of the conceptual model, thus affirming the discriminant validity of the measurement model.

TABLE 2  
The Discriminant Validity Test Findings

Constructs	Communi- cation	Participa- -tion	Performance Evaluation	Procedural Justice
Communication				
Participation	0.780			
Performance Evaluation	0.764	0.761		
Procedural Justice	0.712	0.663	0.769	

#### 4.4 RESEARCH HYPOTHESES TESTING

TABLE 3  
The Research Hypotheses Test Findings

Research Hypotheses	Beta ( $\beta$ )	T statistics	p value	R <sup>2</sup>
H1: The relationship between communication and procedural justice	0.268	2.996	0.003	0.633
H2: The relationship between participation and procedural justice	0.061	0.665	0.506	
H3: The relationship between performance evaluation and procedural justice	0.521	6.568	0.000	

Table 3 presents the findings of the research hypotheses test. The inclusions of communication, participation, and performance evaluation in the analysis had explained 63.3 percent of the variance in procedural justice. This result indicates that the overall predictive strength of the model is substantial (Hair et al., 2017). The research hypotheses testing reveals three important findings. First, communication significantly associated with procedural justice ( $\beta = 0.268$ ;  $T = 2.996$ ). Thus, H1 is supported. Second, participation non-significantly associated with procedural justice ( $T = 0.665$ ;  $T = 0.506$ ). Thus, H2 is not supported. Lastly, performance evaluation

significantly associated with procedural justice ( $\beta = 0.521$ ;  $T = 6.568$ ). Thus, H3 is supported. These findings indicate that communication and performance evaluation significantly contribute to procedural justice, with performance evaluation having the strongest influence, while participation does not show a significant relationship with procedural justice in this studied organization.

#### 4.5 IMPORTANT-PERFORMANCE MAP ANALYSIS

TABLE 4  
The Important-Performance Map Analysis (IPMA) Findings

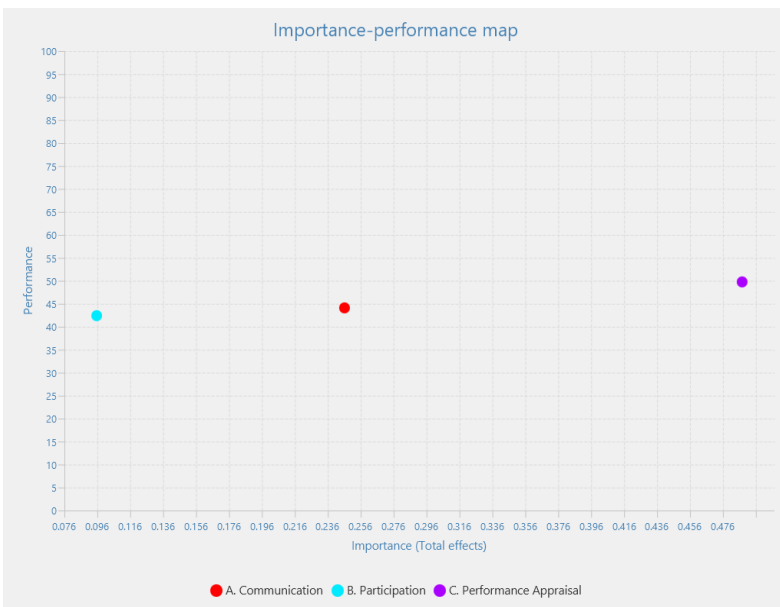


Table 4 presents the findings of the Important-Performance Map Analysis. The Important-Performance Map Analysis indicates that performance evaluation is the most critical factor for enhancing procedural justice, with the highest value of importance (0.476) and performance (50), suggesting it is both essential and well-executed. Communication holds moderate to high importance (0.256) with moderate performance (45), indicating it is crucial but needs substantial improvement. Conversely, Participation is the least important (0.116) and shows lower performance (43), suggesting it is less critical for procedural justice and is currently underperforming. These findings emphasize prioritizing improvements in

communication to enhance procedural justice, while performance evaluation remains a key strength.

## 5. CONCLUSION

This study investigated the relationship between key components of PBPM and procedural justice. It utilized the consistent PLS-SEM Bootstrapping and Importance-Performance Map Analysis procedure to achieve the research objectives. The findings revealed that communication and performance evaluation have a significant relationship with procedural justice. Therefore, communication and performance evaluation significantly enhance procedural justice, with performance evaluation having the strongest influence. In contrast, participation did not show a significant relationship with procedural justice. Additionally, the Importance-Performance Map Analysis highlighted performance evaluation as the most critical and well-executed component, followed by communication, and participation, which was the least critical and underperforming.

The results contribute to the theoretical understanding of procedural justice by highlighting the significant roles of communication and performance evaluation. This study underscores the necessity of integrating effective communication channels and robust performance evaluation systems to foster perceptions of fairness in organizational settings. Methodologically, the use of PLS-SEM provided a robust analytical framework to assess the relationships between PBPM components (communication, participation, and performance evaluation) and procedural justice. This approach allowed for a comprehensive examination of the direct effects and provided insights into the relative importance and performance of each component, which are crucial for both theoretical and practical advancements.

From a practical perspective, these findings suggest that organizations should prioritize enhancing the communication and performance evaluation processes to improve procedural justice. Effective communication facilitates transparency and trust, which are essential for fair treatment perceptions among employees. Meanwhile, performance evaluation systems that provide structured feedback, recognition, and developmental opportunities play a crucial role in reinforcing procedural justice. Organizations are encouraged to invest

in training and development programs that enhance managers' communication skills and improve the design and implementation of performance evaluation systems.

The study's findings have important social implications, particularly in promoting fair and equitable workplace practices. Enhancing procedural justice through effective communication and performance evaluation can lead to a more inclusive and just work environment, contributing to higher employee morale, job satisfaction, and overall organizational commitment. This, in turn, can reduce workplace conflicts and improve employee well-being, thereby fostering a positive organizational culture that values fairness and transparency. Such an environment is likely to attract and retain talent, further contributing to the organization's long-term success.

Despite its contributions, this study has several limitations. First, the research was conducted within a specific organizational context, which may limit the generalizability of the findings to other settings or industries. Second, the cross-sectional nature of the study does not allow for causal inferences to be made about the relationships between performance-based pay management components and procedural justice. Third, the reliance on self-reported data may introduce biases, such as social desirability bias, which could affect the accuracy of the findings. Future research should address these limitations to enhance the robustness and applicability of the results.

Future research should consider longitudinal studies to better understand the causal relationships between performance-based pay management components and procedural justice. Exploring these relationships across different organizational contexts and industries can provide more generalizable insights. It would also be beneficial to examine the role of other potential mediators and moderators, such as organizational culture or leadership styles, in the relationship between performance-based pay management and procedural justice. Further, employing mixed-method approaches, including qualitative data, could offer deeper insights into the underlying mechanisms and employee perceptions related to procedural justice.

## REFERENCES

- Amini, A., and I. Kemal. "The Effect of Trust and Job Satisfaction on Citizenship Organizational Behavior in High School." *Al-Ishlah: Jurnal Pendidikan* 13, no. 2 (2021): 1348-357.
- Azman, I., R. Mohd Sani, and H. Mohamad Mahmood. "Communication Openness in Performance Appraisal

- Systems Enhancing Job Satisfaction.” *Journal of Public Administration, Finance and Law* no. 5 (2014): 98–109.
- Bajaj, R. “Effectiveness of Fair Pay and Working Hours for Employees Working Remotely.” *Journal of Strategic Human Resource Management* 10, no. 3 (2021): 18-24.
- Brown, M., A.J. Nyberg, I. Weller, and S.D. Strizver. “Pay Information Disclosure: Review and Recommendations for Research Spanning the Pay Secrecy–Pay Transparency Continuum.” *Journal of Management* 48, no. 6 (2022): 1661-694.
- Chan, G.K. “AI Employment Decision-Making: Integrating the Equal Opportunity Merit Principle and Explainable AI.” *AI & Society* 39, no. 3 (2024): 1027-038.
- Cohen, Jacob. *Statistical Power Analysis for the Behavioural Sciences*. Hillsdale, NJ: Erlbaum, 1988.
- Colquitt, J.A., E.T. Hill, and D. De Cremer. “Forever Focused on Fairness: 75 Years of Organizational Justice in Personnel Psychology.” *Personnel Psychology* 76, no. 2 (2023): 413-35.
- Creswell, John W. *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (4th Edition). California: SAGE publications, 2015.
- De Clercq, D., and R. Pereira. “Unfair, Uncertain, and Unwilling: How Decision-Making Unfairness and Unclear Job Tasks Reduce Problem-Focused Voice Behavior, Unless There Is Task Conflict.” *European Management Journal* 41, no. 3 (2023): 354-65.
- De Clercq, D, Y. Mahmood Kundi, S. Sardar, and S. Ullah Shahid. “Perceived Organizational Injustice and Counterproductive Work Behaviours: Mediated by Organizational Identification, Moderated by Discretionary Human Resource Practices.” *Personnel Review* 50, no. 7/8 (2021): 1545-565.
- Deepa, R., and R. Baral. “Is My Employee Still Attracted to Me? Understanding the Impact of Integrated Communication and Choice of Communication Channels on Employee Attraction.” *Corporate Communications: An International Journal* 27, no. 1 (2022): 110-26.
- Galeazzo, A., A. Furlan, and A. Vinelli. “The Role of Employees' Participation and Managers' Authority on Continuous Improvement and Performance.” *International Journal of*

- Operations & Production Management* 41, no. 13 (2021): 34-64.
- Govender, M., and M.H. Bussin. "Performance Management and Employee Engagement: A South African Perspective." *SA Journal of Human Resource Management* 18, no. 1 (2020): 1-19.
- Ha, T.S., and K.K. Moon. "Distributive Justice, Goal Clarity, and Organizational Citizenship Behavior: The Moderating Role of Transactional and Transformational Leadership." *Sustainability* 15, no. 9 (2023): 1-20.
- Hair, Joseph F., G. Tomas M. Hult, Christian M. Ringle, and Marko Sarstedt. *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*(2nd Edition). Thousand Oaks, CA: SAGE Publications, 2017.
- Hardwicke, T.E., and E.J. Wagenmakers. "Reducing Bias, Increasing Transparency and Calibrating Confidence with Preregistration." *Nature Human Behaviour* 7, no. 1 (2023): 15-26.
- Ibarra-Sáiz, M.S., G. Rodríguez-Gómez, and D. Boud. "Developing Student Competence through Peer Assessment: The Role of Feedback, Self-Regulation and Evaluative Judgement." *Higher Education* 80, no. 1 (2020): 137-56.
- Jamaiudin, N. "Determinants of Integrity in the Implementation of Performance Appraisal System (PAS): The Case of Malaysia Enforcement Agency." *Management Research Journal* 10, no. 1 (2021): 24-41.
- Kang, E., and H. Lee. "Employee Compensation Strategy as Sustainable Competitive Advantage for HR Education Practitioners." *Sustainability* 13, no. 3 (2021): 1-23.
- Kryscynski, D., R. Coff, and B. Campbell. "Charting a Path Between Firm-Specific Incentives and Human Capital-Based Competitive Advantage." *Strategic Management Journal* 42, no. 2 (2021): 386-412.
- Lambert, E.G., L.D. Keena, M. Leone, D. May, and S.H. Haynes. "The Effects of Distributive and Procedural Justice on Job Satisfaction and Organizational Commitment of Correctional Staff." *The Social Science Journal* 57, no. 4 (2020): 405-16.
- Marasi, Sara A. *Pay Communication: An Overview, Scale Development and Analysis of Its Influence on Workplace Deviance*. Louisiana: Louisiana Tech University, 2014.

- Milesi, P. "Identity Leadership, Procedural Justice, and Group Identification in Uncertain Organizational Contexts." *Journal of Applied Social Psychology* 52, no. 9 (2022): 886-911.
- Milkovich, George, Jerry Newman, and Barry Gerhart. *Compensation*. 4th ed. New York: McGraw-Hill International, 2014.
- Murtiningsih, R.S. "The Impact of Compensation, Training & Development, and Organizational Culture on Job Satisfaction and Employee Retention." *Indonesian Management and Accounting Research* 19, no. 1 (2020): 33-50.
- Newman, D.T., N.J. Fast, and D.J. Harmon. "When Eliminating Bias Isn't Fair: Algorithmic Reductionism and Procedural Justice in Human Resource Decisions." *Organizational Behavior and Human Decision Processes* 160 (2020): 149-67.
- Park, H., D. Ahn, K. Hosanagar, and J. Lee. "Designing fair AI in human resource management: Understanding tensions surrounding algorithmic evaluation and envisioning stakeholder-centered solutions". In *Proceedings of the 2022 CHI conference on human factors in computing systems* (2022): 1-22.
- Pathardikar, A.D., P.K. Mishra, and S. Sahu. "Procedural Justice Influencing Affective Commitment: Mediating Role of Organizational Trust and Job Satisfaction." *Journal of Asia Business Studies* 17, no. 2 (2023): 371-84.
- Pichler, S., G. Beenen, and S. Wood. "Feedback Frequency and Appraisal Reactions: A Meta-Analytic Test of Moderators." *The International Journal of Human Resource Management* 31, no. 17 (2020): 2238-263.
- Porumbescu, G.A., S.J. Piotrowski, and V. Mabillard. "Performance Information, Racial Bias, and Citizen Evaluations of Government: Evidence from Two Studies." *Journal of Public Administration Research and Theory* 31, no. 3 (2021): 523-41.
- Purandare, S., and A. Kumar. "Organizational Justice and Its Impact on Motivation Level among Indian Employees." *Empirical Economics Letters* 20 (2021): 367-73.
- Rasheed, M.I., W.N. Jamad, A.H. Pitafi, and S.M.J. Iqbal. "Perceived Compensation Fairness, Job Design, and Employee Motivation: The Mediating Role of Working Environment." *South Asian Journal of Management* 14, no. 2 (2020): 229-46.

- Rubin, E.V., and A. Edwards. "The Performance of Performance Appraisal Systems: Understanding the Linkage Between Appraisal Structure and Appraisal Discrimination Complaints." *The International Journal of Human Resource Management* 31, no. 15 (2020): 1938-957.
- Rueda, J., J.D. Rodríguez, I.P. Jounou, J. Hortal-Carmona, T. Ausín, and D. Rodríguez-Arias. "'Just' Accuracy? Procedural Fairness Demands Explainability in AI-Based Medical Resource Allocations." *AI & Society* 39, no. 3 (2024): 1411-422.
- Sahay, U., and G. Kaur. "A Systematic Review of the Impact of Performance Appraisal Systems and Competency Management Framework on the Performance of Employees in the Telecom Sector." *Psychology and Education* 58, no. 1 (2021): 2515-531.
- Salas-Vallina, A., J. Alegre, and Á. López-Cabrales. "The Challenge of Increasing Employees' Well-Being and Performance: How Human Resource Management Practices and Engaging Leadership Work Together Toward Reaching This Goal." *Human Resource Management* 60, no. 3 (2021): 333-47.
- Sekaran, Uma, and Roger Bougie. *Research Methods For Business: A Skill Building Approach* (7th Edition). United Kingdom: John Wiley & Sons, Inc., 2016.
- Shah, S., and D.N. Jabeen. "The Fairness of Performance Evaluation in Pakistani Civil Bureaucracy: Factors Influencing the Perceived Fairness of Performance Appraisal System in Federal Civil Services of Pakistan." *Governance and Management Review* 1, no. 1 (2016): 70-89
- Silla, I., F.J. Gracia, and J.M. Peiró. "Upward Voice: Participative Decision Making, Trust in Leadership and Safety Climate Matter." *Sustainability* 12, no. 9 (2020): 1-17.
- Strine Jr., L.E., and K.M. Smith. "Toward Fair Gainsharing and a Quality Workplace for Employees: How a Reconceived Compensation Committee Might Help Make Corporations More Responsible Employers and Restore Faith in American Capitalism." *Business Lawyer* 76 (2020): 31-58.
- Sutrisno, A., and M.A. Muslim. "Building a Performance Allowance System Merit-Based Pay in the Public Sector." *Jurnal Indonesia Sosial Teknologi* 5, no. 3 (2024): 736-41.
- Thurston, P.W., and L. McNall. "Justice Perceptions of Performance Appraisal Practices." *Journal of Managerial Psychology* 25, no. 3 (2010): 201-28.

- Tran, T.V., S. Lepistö, and J. Järvinen. "The Relationship Between Subjectivity in Managerial Performance Evaluation and the Three Dimensions of Justice Perception." *Journal of Management Control* 32, no. 3 (2021): 369-99.
- Tse, F.Y. "Learning About Pay at Work: A Labour Process Approach to Pay Transparency." *Work, Employment and Society* 37, no. 5 (2023): 1147-164.
- Ugarte, S.M., and J. Rubery. "Gender Pay Equity: Exploring the Impact of Formal, Consistent and Transparent Human Resource Management Practices and Information." *Human Resource Management Journal* 31, no. 1 (2021): 242-58.
- Ulfsdotter Eriksson, Y., B. Larsson, and P. Adolfsson. "Under the Surface of Individual and Differentiated Pay in Sweden: A Zero-Sum Game of Performance-Based Pay?" *British Journal of Industrial Relations* 59, no. 2 (2021): 398-417.
- Van Oijen, P. "Driving Value Creation Through Proper Design of Goal Realization Frameworks." *Journal of Creating Value* 6, no. 2 (2020): 271-85.
- Varma, A., I. Zilic, A. Katou, B. Blajic, and N. Jukic. "Supervisor-Subordinate Relationships and Employee Performance Appraisals: A Multi-Source Investigation in Croatia." *Employee Relations: The International Journal* 43, no. 1 (2020): 45-62.
- Vosen, E. "Social Media Screening and Procedural Justice: Towards Fairer Use of Social Media in Selection." *Employee Responsibilities and Rights Journal* 33 (2021): 281-309.
- Wong, S.C. "Competency Definitions, Development and Assessment: A Brief Review." *International Journal of Academic Research in Progressive Education and Development* 9, no. 3 (2020): 95-114.





## **UNDERSTANDING CHARITY: THE MARKET MODEL - EVIDENCE FROM MALAYSIA**

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### **ABSTRACT**

This study theorizes a charity market model. Using the model, measure of necessities (*daruriyyat*) and charity equilibrium have been identified. The developed model offers a practical tool for policymakers to formulate policies regarding poverty eradication, minimum wage, and welfare programs. The proposed model is novel since it incorporates the third-sector economy, where charity (*zakāt* and voluntary charity) is instrumental in empowering society to meet its needs. This study constructs and estimates a theoretical demand and supply model of cash charity, examining determinants such as income, age, education, gender, marital status, household size, location, and job types. The estimations identify the market clearing level of charity, offering a practical approach to determine the threshold level of income for basic needs fulfilment.

JEL Classification: D64; D31; I32; Z12.

Keywords: Demand for charity, Supply of charity, Disposable income, Charity equilibrium, Third sector

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### **1. INTRODUCTION**

Rising economic disparities and the expanding role of the third sector in addressing societal needs require systematic analysis of charitable activities in contemporary economies (Arshad, 2022). The development of robust theoretical frameworks becomes essential to evaluate the socio-economic impact of third-sector interventions. Research on charitable giving within capitalist economies presents

distinct philosophical and analytical challenges (Tridico and Walter, 2018) since charitable behavior is counter-intuitive to conventional self-interested actors (Saccardo et al., 2021).

To address the analytical challenges, this study develops a market-based model to analyze charitable behavior and measure basic needs (*daruriyyat*) from an *Islāmic* economic perspective. The study pursues three primary objectives: (i) constructing a theoretical framework that captures the supply of, and demand for charity; (ii) estimating the equilibrium level of charity that indicates the threshold for basic needs fulfilment, and (iii) providing empirical evidence using Malaysian household dataset to support the developed theory and to demonstrate the policy implications. These objectives offer a systematic approach to understanding charity and providing practical insights for welfare policy consideration.

*Daruriyyat* encompasses the essential elements required to fulfil Shariah objectives, comprising preservation of religion, protection of life, safeguarding of intellect, continuation of progeny, and security of wealth. These components form the *Maqāṣid* of *Sharī‘ah* framework, encompassing multi-dimensional *Islāmic* perspectives on development and well-being (Ibrahim and Ismail, 2015). While Yusof et al. (2019) constructed an index to measure individual holistic development using this framework, the charity market approach proposed by this study offers a practical alternative for quantifying *daruriyyat* through observable charitable behaviors. This study provides a more direct, monetary valuation-based measure of *daruriyyat* compared to the Yusof et al. approach. Although the *maqāṣid*-index offers an assessment for each *maqāṣid* element, the proxies used, particularly for measuring faith-related components, face methodological criticisms. The index approach requires extensive resources for survey implementation, data collection, and analysis, making it costly and time-consuming to develop.

The study by Aziz et al. (2015) provided a critical analysis of development indices through an exhaustive literature review, revealing fundamental limitations that justify the need for alternative measurement approaches. The authors identified several critical challenges, namely, data constraints, improper indicator selection, narrow dimensional focus, exclusion of non-material aspects, weighting and aggregation issues, lack of well-defined frameworks, and limited practical applicability. These limitations particularly affect the practical use of the *Islāmic* development indices, where measuring abstract concepts such as faith and values presents further complexities. While Aziz et al. (2015) advocated for more integrated,

holistic indices with well-articulated frameworks and suitable indicators, this study takes a different approach by utilizing market behavior as an observable proxy for *daruriyyat* measurement. The market-based approach addresses several limitations identified by Aziz et al. (2015) through its use of readily available economic data, a clear measurement framework, and practical applicability across different contexts.

This study advances *Islāmic* economic theory by developing a market-based model of charitable giving. The model aligns with fundamental *Islāmic* principles of wealth circulation and poverty alleviation through its treatment of charity as an economic mechanism. The incorporation of *zakāt* into disposable income calculations integrates a key *Islāmic* distributive scheme into mainstream economic analysis. The model's identification of equilibrium income levels provides quantifiable measures for basic needs (*daruriyyat*) fulfillment, supporting *maqāṣid of shari'ah* objectives of protecting essential human welfare. Building on Arshad and Haneef's (2016) framework, the analysis demonstrates how third-sector activities complement market forces in wealth redistribution and poverty reduction. The empirical findings offer practical policy applications that advance *Islāmic* economic objectives of social justice and equitable distribution.

This study is organized as follows. Section 2 reviews theoretical and empirical literature on market-based charity. Section 3 develops the theoretical framework for charity demand, supply, and equilibrium concepts. Section 4 presents the methodology for estimating charity equilibrium. Section 5 discusses empirical results and their implications. The final section concludes with key insights and future research directions.

## 2. LITERATURE REVIEW: THE ECONOMICS OF CHARITY

Over the past decades, the economics of charity has gained significant traction as a research topic, hailed as an essential aspect for understanding societal welfare (Salamon, 2010). Charity extends beyond monetary donations (Einolf and Chambre, 2011). It involves three main components, namely, monetary donations, in-kind donations, and volunteer time. These various forms of charity weave the social fabric by enhancing societal well-being and cohesion (Putnam, 2000). The international landscape has witnessed an upsurge in charitable contributions (Wit and Bekkers, 2017). The surge,

however, is not consistent globally; the degree of growth differs significantly across countries given the interplay of varied factors such as economic conditions, cultural attitudes, and the level of institutional backing.

Charity possesses distinct economic characteristics setting it apart from conventional goods and services. As a moral good, charity operates under unique market principles. Andreoni (1990) conceptualizes charity as an economic good with distinctive attributes that align with public goods theory. This classification stems from key characteristics identified by Cornes and Sandler (1994). The non-excludability of charity means social benefits generated by charitable acts extend beyond direct donors and recipients, creating positive externalities for the broader community. The non-rivalry aspect, on the other hand, implies that benefits derived from charitable actions do not diminish as more people benefit from them, unlike traditional private goods. These characteristics create a unique economic framework where standard market mechanisms of supply and demand operate differently. The public good nature of charity influences both giving behavior and social welfare outcomes in ways that traditional economic models struggle to capture.

Rubin (1987) argues that a comprehensive examination of charity requires careful investigations into both the economic and ethical dimensions, because of the intertwining of moral, social, psychological, religious, legal, and aesthetic elements within the realm of giving, and receiving. He suggests that a comprehensive understanding of charitable behavior can only result from an investigation of both its economic and non-economic components.

For that, the conventional tools of economic analysis can be limited to unfold the complexities of charitable giving. List (2011) discovered a pattern in religious giving that was resistant to economic fluctuations. The correlations between variations in religious donations and changes in the S&P 500 were weak, suggesting that religious giving may be insulated from broader economic trends. In contrast, contributions to other major sectors, such as education, were more closely aligned with S&P 500 fluctuations. These findings prompted List (2011) to theorize that the motivations guiding religious donations may differ from those governing other charitable contributions, because of the consideration of social insurance and belief in the afterlife.

Based on past trends in charitable giving, there exists a notable correlation between economic prosperity and the scale of charitable contributions, as observed in Wiepking and Handy (2015). Their

findings suggest that giving tends to increase with the rise in disposable income. This notion is further supported by the data provided by Giving USA (2021), which highlights the relationship between socioeconomic conditions and philanthropy. Specifically, during periods of economic downturn, there is often a decrease in charitable donations following a reduction in disposable income. Conversely, periods of economic growth stimulate philanthropic activities. At the same time, empirical evidence suggests that in times of societal disruptions such as natural disasters or pandemics, there is a significant surge in giving as an immediate response to these crises, displaying the inherently compassionate nature of the act.

The phenomenon of demographic transitions also leads to significant changes in the pattern of charitable donations. Wiepking (2010) demonstrates how shifts in societal makeup, including the rise of digital natives and an aging population, give rise to unique trends in charitable behavior. For instance, the millennial generation exhibits a strong inclination toward supporting specific causes and utilizing digital platforms for making donations. This has resulted in a notable departure from traditional practices of charitable giving.

The analysis of charitable organizations through demand and supply theory reveals distinct market characteristics. Bekkers and Wiepking (2011) demonstrate that this theoretical framework, while primarily used for traditional goods markets, offers valuable insights into the charitable sector. This approach enables a framework for a systematic analysis of factors influencing charitable market operations (Einolf and Chambre, 2011). The charity market exhibits unique properties that differentiate it from conventional goods markets. These distinctions stem from the altruistic nature of giving and the public good characteristics of charitable services. The interrelationships between donors, beneficiaries, and charitable organizations create specific market conditions. Ackerman (1996) notes that charitable organizations face competitive pressures: attracting donations and delivering effective services to beneficiaries. Therefore, understanding the economics of charity requires recognizing these distinctive market features and operational mechanisms.

## 2.2 DEMAND FOR CHARITY

The demand for charity, as discussed in this paper, pertains to welfare needs. In general, charity demand may arise from two main sources: non-government organizations and households requiring assistance. The literature presents two distinct streams of research on charity

demand. The first stream systematically investigates charity demand by non-government organizations that offer welfare assistance. The second stream examines household-level charity demand, focusing on how poverty compels households to seek charitable support. The proposed model in this study aligns with the second stream, analyzing charity demand at the household level.

Research on charitable giving has identified multiple determinants that influence the demand for charity. Brehm and Saving (1964), and Sandoval, Rank, and Hirschl (2009) highlighted that income is the primary determinant of charity demand. Income insecurity, a situation where individuals or households face potential substantial losses in income (Cummins, 2000), has a direct effect on charity demand. This relationship explains the reality that financial precariousness often leads individuals and households to seek support from charitable entities. Hence, the relationship between poverty and the need for charitable support is positive (Taylor-Gooby, Gumy, and Otto, 2015). Poverty, characterized by an inability to fulfill essential human needs, invariably increases the demand for charitable aid. This heightened need for assistance is further compounded by the ongoing cycle of poverty (McLaughlin and Rank 2018), which leads to a recurring reliance on charity. Therefore, interventions aimed at alleviating poverty play a vital role in reducing the demand for charity.

Brehm and Saving (1964) established a fundamental theory showing a negative relationship between income and charity demand through a downward sloping demand curve. Charette and Meng (1994) expanded this framework by examining welfare participation among female-headed households in Canada. Their analysis of 1986 Census data identified several key determinants: expected wages, welfare benefit levels, implicit tax rates, age, education, and number of dependents. The findings demonstrated that welfare participation decisions reflect complex socioeconomic factors, suggesting effective programs must balance support with incentives for self-sufficiency. This theoretical insight continues to guide modern analysis of charity demand.

### 2.3 SUPPLY OF CHARITY

The supply of charity is a function of various factors that motivate people toward charitable giving. Andreoni's seminal work in 1990 proposed fundamental motivations for charitable giving based on impure altruism, as opposed to the argument of pure altruism. Pure altruism refers to the complete selflessness in wanting to help others,

whereas impure altruism connects the desire to help others to one's personal satisfaction, derived from the positive feeling of giving known as the warm-glow effect. Based on Andreoni's findings, donors are more inclined to contribute to charity if they can donate directly rather than indirectly through taxes given the warm-glow effect. Tax deductions for charitable donations, for example, can effectively enhance the level of charitable giving. These policies make it financially feasible for donors to contribute to public welfare, while simultaneously intensifying the emotional satisfaction derived from giving.

In conceptualizing charitable giving, Yen (2002) approached donations as an element within consumer goods, where altruistically driven households determine the extent of their donations in conjunction with other expenses, thereby aiming at optimizing utility given the constraint of a budget. Yen's study found a positive relationship between income and charitable giving, demonstrating that, for the United States, an incremental one percent surge in income propels the probability of donating by 0.39 percent. Besides income, age, education, religious affiliation (Bekkers and Schuyt, 2008), and number of children are significant variables in affecting donor giving.

List (2011) echoed this positive relationship between income levels and propensity to donate, revealing that when household earnings exceed \$130,000, over 90 percent of households engage in giving, a stark contrast to the less than 40 percent of households that donate when earning \$20,000 or less. This positive income-donation correlation has been substantiated by many studies including those by Hargaden and Duquette (2024), Arshad (2016), Hall (2001), Jones and Posnett (1991), Kitchen (1992), Lankford and Wycko (1991), and Reece (1979), thereby affirming the positive influence of income on charitable donations.

Andreoni and Payne (2013) expand understanding of charity supply by examining how tax policies and socioeconomic conditions affect giving patterns. Their analysis reveals that charitable behavior responds to multiple influences. Tax incentives shape donor decisions through direct financial effects. Social norms and cultural values create giving expectations within communities. Psychological factors, such as altruism and warm-glow effects, motivate individual donations. This complex donor behavior requires further understanding to formulate effective giving and altruistic behaviors.

### 2.3 CONCEPT OF EQUILIBRIUM IN THE MARKET FOR CHARITY

The concept of equilibrium, a basic principle of economic theory, has distinct implications in the context of charity markets (Biederman, 2013; Roberts, 1984; Ruffin and Leigh, 1973). This equilibrium arises when the supply of charitable donations effectively meets the demand for them. The market forces naturally work toward this state of balance, and deviations from it can stimulate adjustments in both the behavior of donors (supply-side) and recipients (demand-side).

Despite existing literature having extensively explored charitable giving determinants and market characteristics, there remains a significant gap in understanding charity through an integrated market equilibrium framework, particularly from an *Islāmic* economic perspective. Previous studies have largely focused on either supply-side or demand-side analyses in isolation, without examining their simultaneous interaction in determining market-clearing levels. Additionally, while research has explored various measures of basic needs, few studies have attempted to quantify *daruriyyat* through observable market behavior. This study addresses these gaps by developing a comprehensive market model incorporating both *zakāt* and voluntary charity, providing a novel approach to measuring basic needs through charity market equilibrium. The proposed framework offers practical tools for policy formulation while enriching *Islāmic* economic theory through empirical analysis of Malaysian household data.

## 3. THEORETICAL FRAMEWORK

From a market perspective, the demand for charity primarily arises from the poor segment of society, and the supply comes from the affluent demographic. Economic, demographic, and societal variables, such as changes in income levels, taxes, welfare programs, ages, religious belief and wealth distribution patterns, may influence both charity demand and supply, among others. To analyze these relationships, we present a market model of charity in this section.

Personal charity manifests in two primary forms: monetary contributions and volunteered time (List, 2011). This study focuses exclusively on cash donations for several analytical and practical reasons. First, cash charity offers inherent measurability advantages, enabling precise quantification and tracking within a market model framework. This quantifiable nature facilitates direct analysis of how

factors such as income levels influence charitable giving patterns (Brown, Dimmock et al., 2012).

Cash charity provides distinct practical advantages. Its immediate liquidity allows for swift deployment to meet current needs, providing donors with tangible evidence of their charitable impact. Cash donations also can be channelled into capital formations, such as cash *wāqf*, generating sustainable income streams for long-term charitable objectives (Mohsin, 2013). These capital donations, while usually more restrictive in their application, can have a more significant impact over time by creating sustainable income sources for the receiving party.

### 3.1 THE CHARITY DEMAND

The theoretical framework for household charity demand is developed in this section. The model assumes households seek monetary charitable assistance to fulfill basic needs when their resources are insufficient. Income inadequacy represents a fundamental driver compelling households to seek charitable support.

Disposable income ( $I$ ) plays a crucial role in determining household consumption expenditure. For households, disposable income is derived by deducting personal income tax ( $T$ ) from personal income ( $Y$ ). In the *Islāmic* context, where *zakāt* ( $Z$ ) payment is obligatory, disposable income ( $I$ ) equals personal income minus both personal income tax and *zakāt*, expressed as:

$$(1) \quad I = Y - (T + Z)$$

For households below the poverty threshold, their low-income level exempts them from both *zakāt* (on income and saving) and tax obligations (under a progressive tax system). Since both *zakāt* ( $Z$ ) and tax ( $T$ ) equal zero for these households, their personal income equals their disposable income ( $Y = I$ ).

Notice that *zakāt* (compulsory charity) has been considered in calculating disposable income. Therefore, the analyses here primarily deal with modelling the demand and supply of voluntary charity. Since voluntary charity is done at the free will of households, the market for voluntary charity is therefore posited. Given the level of the disposable income, households can either consume ( $M$ ), save ( $S$ ) or give it as charity ( $C$ ), or:

$$(2) \quad I = M + S + C$$

The household demand for charity can be expressed as a function  $D(C)$ , where  $C$  represents the quantity of charity demanded. While many socioeconomic factors affect charitable demand, this analysis focuses on disposable income ( $I$ ) as the primary determinant, with other variables held constant. Although additional factors could enhance the model's complexity, disposable income provides a fundamental foundation for developing the market model for charity. Thus, the demand function for charity is expressed as:

$$(3) \quad D(C) = f(I)$$

The relationship between disposable income and charity demand is negative, where the lower the level of disposable income, the higher the demand for charity by a household, or:

$$(4) \quad \partial D(C) / \partial I < 0$$

where a change in disposable income (increase or decrease) would result in a change in charity demand in an inverse relationship, *ceteris paribus*. For example, an increase in disposable income would reduce the demand for charity as households become more self-sufficient.

Expressing the charity demand function [(equation (3))] into a linear form, yields:

$$(5) \quad D(C) = a + bI + e$$

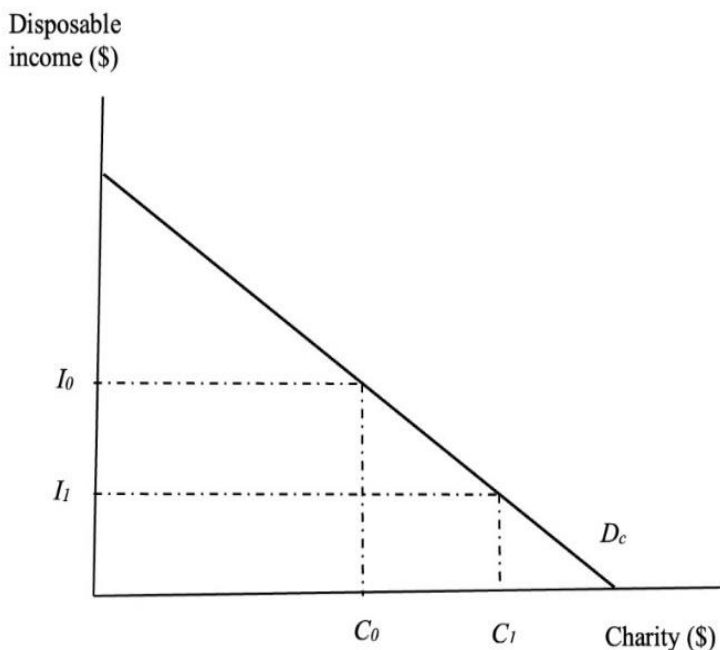
where  $a$ ,  $b$ , and  $c$  represent coefficients to be estimated, and  $e$  is the error term. It is important to note that this representation of the charity demand model is a simplified version. Depending on the specific context, research questions, and data availability, additional variables capturing cultural, social, or demographic factors, could also be introduced into the model.

The relationship between disposable income and charity demand can be represented as a downward sloping curve, as shown in Figure 1. As indicated in the figure, the horizontal axis measures the level of cash charity,  $C$ , in dollars (\$) while the vertical axis measures the level of disposable income,  $I$ , in dollars (\$).

Line  $D_c$  in Figure 1 is a downward sloping curve. It implies a negative relationship between quantity demanded for charity and disposable income level. The level of charity demanded is high given a lower income level, *ceteris paribus*. As indicated in Figure 1, a household with income of  $I_0$ , would demand for  $C_0$  level of charity. As

income level decreases, for example, to  $I_1$ , the quantity demanded for charity declines to  $C_1$ , ceteris paribus. By joining the identified points  $C_0$  and  $C_1$ , the demand for charity that corresponds to disposable incomes,  $I_0$  and  $I_1$  respectively, can be represented by a downward sloping curve. The downward slope implies the negative relationship between the level of income and the quantity of charity demanded.

FIGURE 1  
Charity Demand Curve



The demand for charity responds to various non-income factors that could shift the demand curve. Inflation could constrain household purchasing power, thereby increasing their need for charity, leading to an upward shift in the demand curve. Complementary income, such as that provided by a working spouse, could lower the demand for charity, triggering a downward shift in the curve. The number of dependents in a household also significantly influences charity demand (Bekkers and Wiepking, 201). After exploring the factors influencing demand for charity, the next section examines the supply side of charity.

### 3.2 THE CHARITY SUPPLY

To formulate a supply function for charity, it is vital to consider the determinants of charitable giving. For that, the supply of charity, denoted as  $S(C)$ , could be affected by numerous variables. In this section, the simplified model of charity supply function is expressed as a function of disposable income ( $I$ ), or:

$$(6) \quad S(C) = f(I)$$

It is observed that the supply of charity tends to rise as donors' income increases (recall Section 2.3). The expected positive relationship can be expressed as:

$$(7) \quad \partial S(C)/\partial I > 0$$

The charity supply function in Equation (6) can be specified in a linear form as:

$$(8) \quad S(C) = a + bI + e$$

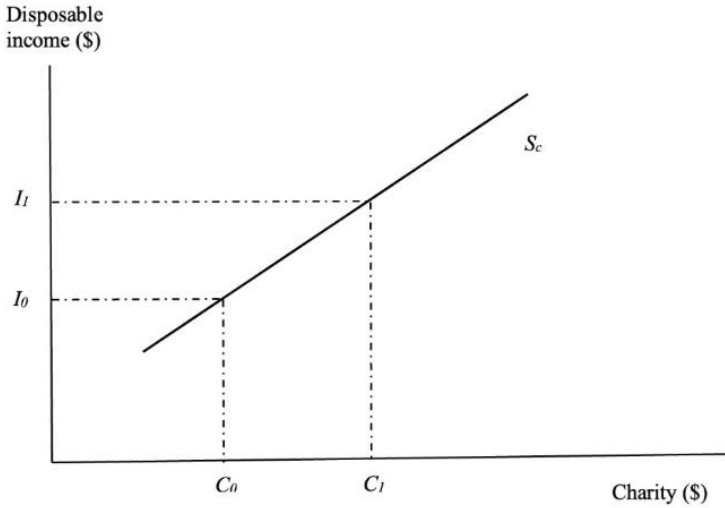
where  $a$  is the intercept  $b$  is the coefficient to be estimated (with the expected positive sign) and  $e$  is the error term.

As illustrated in Figure 2, the positive relationship between disposable income and quantity of charity supplied is captured by the upward sloping curve. Referring to Figure 2, as the level of household income rises, the level of charity supplied also rises, *ceteris paribus*. A household with low disposable income, such as  $I_0$ , would supply only  $C_0$  level of charity. As the income rises to  $I_1$ , the quantity of charity supplied increases to  $C_1$ , *ceteris paribus*. These points form the upward-sloping charity supply curve, representing the systematic relationship between household income and charitable giving.

Apart from disposable income, many factors can influence charitable giving, such as inflation and complementary income. Changes in these factors can shift the charity supply curve either rightward or leftward. For instance, lower inflation rates, which enhance purchasing power, could potentially spur an increase in charitable giving (hence shifting the charity supply curve rightward). Additional household income, known as complementary income, can also increase the supply of charity (the charity supply shifts to the

right), since households with multiple income streams often exhibit a higher propensity for giving. With a clear understanding of the factors influencing the supply of charity, we now transition to examine the interplay between demand and supply in the charity market.

FIGURE 2  
Charity Supply Curve



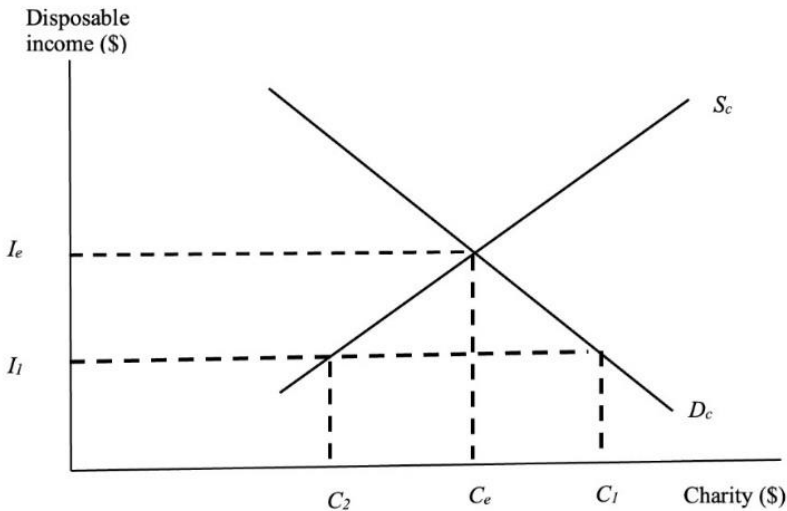
### 3.3 THE CHARITY MARKET

Figure 3 illustrates the market for charity. The aggregate demand for charity is constructed by the horizontal summation of every household's demand for charity at every level of disposable income. The aggregate demand curve for charity is downward sloping, reflecting the inverse relationship between the overall value of charity demanded in response to increase in disposable income in the economy, *ceteris paribus*. The Y-intercept of the demand curve (D) represents the maximum value at which recipients are willing to receive charity when the disposable income is zero, signifying a high need for charity.

The aggregate supply of charity is derived from the horizontal sum of household charity supplied at each level of disposable income. This upward slope of the supply curve signifies a direct relationship between the value of charity and disposable income in the economy, assuming other factors remain constant.

As shown in Figure 3, the market for charity is in equilibrium when the aggregate demand and supply intersect. At the equilibrium point, the quantity (dollar) demanded for charity is equal to the quantity supplied of charity. The corresponding charity level is the equilibrium level of charity ( $C_e$ ) or the market-clearing charity. The equilibrium charity ( $C_e$ ) can be interpreted as the average monetary value that society places on providing and receiving charity. The corresponding income ( $I_e$ ) is the equilibrium income for basic needs fulfilment. This point has several economic implications, to be discussed now.

FIGURE 3  
Charity Equilibrium



In a steady-state market, any deviation from the equilibrium point would result in forces that push the market back toward equilibrium. For instance, if the demand for charity were to increase because of a decline in the disposable income, the increased need for assistance would put upward pressure on the monetary value of charity (e.g., more beggars in the street and more calls for donations). This would, in turn, incentivize more donors to provide support, moving the market back toward equilibrium.

The model posits that any income below  $I_e$  is insufficient for satisfying basic needs. For instance, at the income level of  $I_l$ , the aggregate demand for charity,  $C_1$ , surpasses the aggregate supply of charity,  $C_2$ , indicating a charity shortage where the need for charity

outstrips its provision. As previously underlined, the equilibrium point denotes the income level necessary to meet basic needs, thereby offering a monetary representation of *daruriyyat*. This model provides a more pragmatic method in quantifying *daruriyyat* than, for example, the *maqāsid*-index approach as developed by Yusof et al. (2019).

The equilibrium point serves as a vital reference for policymakers evaluating the efficacy of their interventions in the charitable sector. For instance, the impact of tax incentives or government social welfare programs can be gauged by examining their effects on the equilibrium value and quantity of charity. Policies propelling the market toward equilibrium are deemed more successful in addressing recipient needs and encouraging donor willingness to give. Moreover, determining the equilibrium income ( $I_e$ ) is essential in poverty eradication efforts. This reference measure aids in shaping welfare programs such as public transfer programs, minimum wage policy, and poverty or *zakāt* collection and distribution (Ahmad and Ma'in, 2014).

#### 4. METHODOLOGY

This section presents empirical tests of the theory proposed in Section 3, focusing on estimating the equilibrium level of charity. As previously argued, this exercise is crucial in identifying the equilibrium point, which also serves as a measure of the level of necessity or *daruriyyat* within the economy.

##### 4.1 ESTIMATION MODELS

To estimate the charity and basic needs equilibrium levels, the econometric empirical model of demand for charity is expressed as:

$$(9) \quad \ln receive_i = \alpha + \beta_1 \ln earn_i + \sum_{k=2}^K \beta_k X_{ki} + \epsilon_i$$

where  $\ln receive_i$  denotes natural log of demand for charity (charity received) by household  $i$  ( $i = 1, 2, \dots, I$ ),  $\alpha$  is the intercept,  $\ln earn_i$  represents the natural log of earnings of household  $i$ , and  $X_{ki}$  ( $k = 2, 3, \dots, K$ ), are other variables deemed important to have influence on demand for charity,  $\beta$ s are parameters to be estimated and  $e_i$  is the error term.

$age_i$  represents the age of household  $i$ ,  $X_{ki}$ , ( $k = 3, 4, 5, \dots, K$ ), are other variables deemed important to have influence on demand for charity,  $\beta_s$  are parameters to be estimated and  $\varepsilon_i$  is the error term.

Then, the empirical model of supply of charity is expressed as:

$$(10) \quad \ln give_i = \gamma + \delta_1 \ln earn_i + \sum_{k=2}^I \delta_k X_{ki} + e_i$$

where  $\ln give_i$  denotes natural log of supply of charity (charity given) by household  $i$  ( $i = 1, 2, \dots, I$ ),  $\gamma$  is the intercept,  $\ln earn_i$  represents the natural log of earnings of household  $i$ , and  $X_{ki}$ , ( $k = 2, 3, \dots, K$ ), are other variables deemed important to have influence on supply of charity,  $\delta_s$  are parameters to be estimated and  $e_i$  is the error term.

This study uses private transfer payments received as a proxy for the demand for charity and private transfer payments made as a representation of the charity supply. The selection of these proxies stems from the unavailability of specific charity received and given data in the utilized Household Income Survey data. The use of private transfers as a stand-in for charity aligns with common practice in empirical studies, as stated by Cox and Jimenez (1990).

The independent variables,  $X_{ki}$ , for both equations include age, marital status, gender, education level, employment activities/sector, ethnicity and geographical location (Bekkers and Wiepking, 2011; Arshad 2016). The variables notations and descriptive statistics of the samples are provided in Appendix 1 and 2. Both equations (9) and (10) are then estimated using least squares techniques.

## 4.2 DATA COLLECTION

The present study utilizes the 2009 Household Income Survey (HIS) data from the Department of Statistics, Malaysia. The HIS represents Malaysia's primary source for household income statistics, conducted bi-annually to monitor the nation's income distribution patterns and household economic well-being. While employing more recent HIS data would ideally render the estimations more current, the 2009 data was the most recent available to the author at time of model testing. Despite the dated data, this dataset successfully fulfills the intended objectives of the study.

The estimations involve 22,780 observations representing Malaysian households. While this sample constitutes approximately 0.34% of the total 6.6 million Malaysian households in 2009, the

dataset employs a stratified random sampling methodology ensuring representativeness across geographic regions (13 states and 3 federal territories), urban-rural divisions (56.35% urban households), ethnic composition (71.36% Bumiputera, 20.63% Chinese, 6.47% Indian, 1.54% Others), and income groups (bottom 40%, middle 40%, and top 20%).

The survey captures comprehensive household information such as household income, private transfer payments (received and given), demographic characteristics (age, gender, marital status), socioeconomic indicators (education, employment, industry), geographic location (state, urban/rural classification), and household composition and relationships. Each respondent has a unique identifier. The variables used in the empirical analysis are summarized in Appendix 1 and 2, providing detailed descriptive statistics. The dataset's comprehensive variable coverage and substantial sample size of 22,780 observations meet the methodological requirements for robust empirical analysis of charitable behavior.

## 5. ESTIMATION RESULTS AND DISCUSSION

Results of the estimations of equations (9) and (10) are presented in Table 1. Since the purpose of running the estimations is to find the equilibrium charity level, the focus of the discussion will be dedicated to explaining how the results fit into the proposed theory (refer to Section 5.1). This sub-section only provides a brief discussion on the overall estimation results.

As shown in Table 1, household income has a significant positive effect on charity given (supply of charity) while it has a significant negative effect on charity received (demand for charity). The positive relationship between income and quantity of charity supplied means that as income level rises, the contribution toward charitable giving will also rise (as illustrated in Figure 2). On the other hand, in the case of charity received, the inverse relationship between income and charity means as income rises, less charity will be demanded (refer to Figure 1). The findings therefore support the theoretical frameworks established in Section 3.

TABLE 1  
Estimation Results

Variables	(Based on Eq. 10)	(Based on Eq/ 9)
	Charity supply $\ln(give)$	Charity demand $\ln(receive)$
<i>lnearn</i>	1.033*** (0.013)	-0.312*** (0.012)
Age	-0.016*** (0.001)	0.047*** (0.001)
Male	-0.100*** (0.019)	0.167*** (0.024)
Married	0.024 (0.027)	0.449*** (0.029)
Chinese	0.196*** (0.022)	0.118*** (0.027)
Indian	0.385*** (0.036)	-0.170*** (0.046)
Others	-0.027 (0.095)	-0.385*** (0.087)
Urban	0.348*** (0.019)	0.174*** (0.022)
Constant	-2.600*** (0.126)	6.538*** (0.119)
Observations	21,663	16,732
R-squared	0.464	0.319

Robust standard errors in parentheses

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Age has a negative relationship with charity supply while it has a positive relationship with charity demand. The negative relationship implies that charitable giving is high among the young, but it is low for the much older persons in Malaysia. Concern over life after retirement could be the reason for the trend. On the other hand, the positive difference between age and demand for charity shows the rising need for charitable donations among older households. As one gets older, the need for charity also rises, *ceteris paribus*. Again, this trend could be related to the issue of social security among older people in Malaysia. It has been estimated that, in Malaysia, retirees on average exhaust their EPF savings within four years of retirement. Unless they have a pension, or complementary family income, this group might need to depend on charity.

While previous studies such as Arshad (2016) and Brown and Ferris (2007) found evidence of an inverted U-shaped relationship between age and charitable giving, this study employs a linear specification of age for several reasons. First, diagnostic tests confirm that the linear specification meets model specification requirements. Second, the linear form effectively achieves the primary objective of identifying the market-clearing level of charity without introducing additional complexity that would arise from including age-squared terms. The current model shows age has a negative effect on charity supply (-0.016) and a positive effect on charity demand (0.047). Nonetheless, future research could explore potential non-linear age effects in the Malaysian context to provide deeper insights into how charitable behavior changes across different life stages.

The effect of marriage is insignificant on the supply of charity. Marriage, however, has a significant positive effect on the demand for charity. The need to support family is one possible reason for this relationship. As shown in Model (2), married households need 52% (the calculation is given by  $100[\exp(0.419) - 1]$  since the dependent variable is logged and the dependent variable is a dummy) more than household headed by a single, *ceteris paribus*. The results in Table 1 also shows that all the demographic variables such as gender, race and geographical location have significant effect in explaining the supply of and demand for charity in Malaysia.

Now the discussion turns to the estimation of charity equilibrium. Following the estimation in Table 1, the base model for both demand and supply of charity, assuming other things constant, is now given:

$$(11) \text{ Supply of charity: } \ln(\textit{give}) = -2.6 + 1.033\ln(\textit{earn})$$

$$(12) \text{ Demand for charity: } \ln(\textit{receive}) = 6.538 - 0.312*\ln(\textit{earn})$$

Figure 4 illustrates the intersection of charity supply and demand curves derived from equations (11) and (12). The equilibrium indicates the market-clearing point where charity supply equals demand. At this point, the estimated equilibrium level of disposable income can be calculated as:

$$-2.6+1.033\ln(\textit{earn}) = 6.538-0.312\ln(\textit{earn})$$

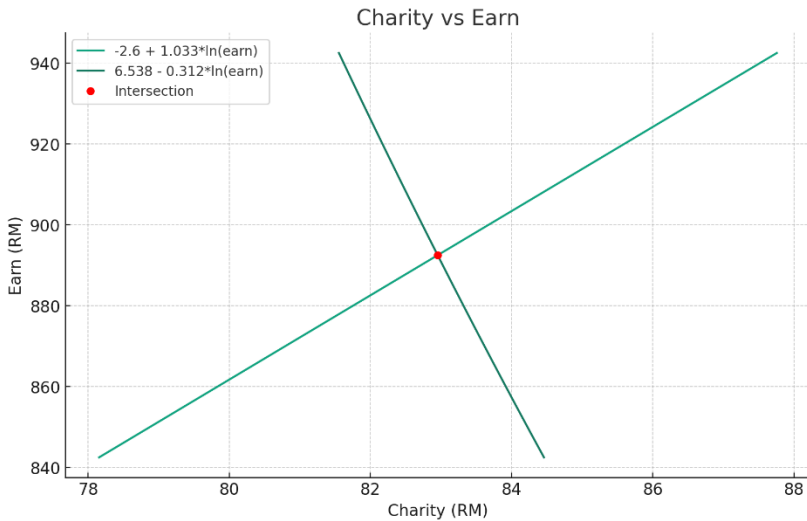
$$1.033\ln(\textit{earn}) - 0.312\ln(\textit{earn}) = 6.538 - (-2.6)$$

$$\textit{earn} = \text{RM}892.52$$

Now, the charity equilibrium level can be calculated as:

$$\ln(\textit{charity}) = -2.6+1.033*\ln(892.52) = \text{RM}82.95$$

FIGURE 4  
Estimated Charity Equilibrium



From the above calculations, the equilibrium levels of disposable income and charity are RM892.52 and RM82.95 per month, respectively. The value of RM892.52 (monthly) signifies the equilibrium disposable income for the charity market to clear. This value represents the threshold of disposable income. It refers to the minimum amount of money a person needs to earn before they feel comfortable giving some of it away to charity. When people reach this income level, it encourages more donations, which boosts the charity market. The value of RM892 represents the average cost of fulfilling necessities for impoverished households. This amount also serves as a threshold for welfare provision in efforts to eradicate hardcore poverty. From the donor's perspective, the value indicates the marginal benefit of charity, where the utility gained from each ringgit donated up to RM892 equals or exceeds the associated sacrifice. Also, the equilibrium value provides a critical reference point for tax incentives, where RM892 marks the minimum charitable contribution qualifying for tax deductions. This measure establishes a basis for analyzing how tax policies affect charitable giving patterns in future research.

Another derived value is the equilibrium charity level of RM82.95 (monthly). It is calculated by substituting the equilibrium disposable income (RM892.52) into the estimated supply equation. This value represents the market-clearing amount where charitable

giving and receiving achieve balance in the Malaysian economy. At this equilibrium point, the quantity of charity supplied by donors exactly matches recipients' demands, creating an efficient distribution of charitable resources. The RM82.95 figure reflects society's collective valuation of charitable support, capturing the aggregate monetary value that Malaysian society places on charitable transactions. This amount indicates the average monthly charitable transfer required to complement household incomes up to the basic needs threshold of RM892.52. For policymakers, this equilibrium charity level serves as a quantitative benchmark, suggesting the natural level of charitable support needed in the economy to maintain market balance at the basic needs income threshold.

This finding complements other approaches to measuring basic needs, such as Bank Negara Malaysia's living wage concept introduced in 2018 (Chong and Adam, 2018). The living wage concept estimates the income required for a household to afford a "minimum acceptable" living standard in Malaysia, which ranges from RM2,700 to RM6,500 monthly depending on household location and composition. While Bank Negara's living wage framework estimates comprehensive household needs, the market-clearing charity level of RM892.52 identified in this study establishes a critical minimum threshold. This alignment between market-determined charitable needs and the living wage concept strengthens the case for incorporating living wage considerations into Malaysian economic policy discourse. These two independent approaches, one based on market behavior and another on needs and wants assessment, suggests that current policy discussions may benefit from greater attention to both measures as tools for addressing household economic security.

## 6. CONCLUDING REMARKS

The present study situates itself within the broader discourse on the charity market model. It introduces a novel theoretical approach to *Islāmic* economics by incorporating *zakāt* to measure the *daruriyyat* level. The proposed model has been backed by empirical estimations using data based on Malaysia. The identified charity equilibrium level offers robust comparison with conventional socio-economic indicators. For comparison, based on data drawn from the 2009 Household Income Survey (HIS) conducted by the Department of Statistics Malaysia, the median monthly income for households was noted at RM2,841, whereas the average monthly income was

RM4,025. These figures establish a significant reference point for analyzing changes in charity equilibrium.

For instance, in 2009, the relative poverty in Malaysia, calculated by households earning less than half of the median income, was set at RM1,420 per month, while the hardcore poverty line, determined as half of the relative poverty line, was estimated at RM710 per month. The disposable income equilibrium level, defined as a crucial threshold for necessity, was determined at RM892. This figure is slightly higher than the hardcore poverty line. Nevertheless, it offers a comparable measure of hardcore poverty estimated using the proposed model.

In 2013, the minimum wage law was first introduced in Malaysia. The minimum wage rates were set at RM900 per month for Peninsular Malaysia and RM800 per month for East Malaysia, providing another comparable reference against the computed charity equilibrium level of RM892.

Identification of the equilibrium level has provided a viable method for an alternative measure of necessity. This approach is significantly different from the commonly used index approach in *daruriyyat* measures. The charity equilibrium framework offers a quantitative tool for analyzing socioeconomic conditions in Malaysia. The findings offer substantive insights to guide empirical research and policy formulation.

This study offers an innovative approach to the understanding and measurement of charitable giving within an economic framework, and its role as a barometer for necessities. The exploration began by conceptualizing charity as a market activity, subject to the laws of supply and demand. The study further substantiated the charity market model by rigorously analyzing both supply and demand factors using econometric models. The development of a quantitative model to interpret these influences represents a noteworthy addition to existing literature and further enriches the current understanding of the charity market's complexities.

The findings of this research bear significant implications for policymakers striving to make data-driven welfare decisions. The proposed model is useful for identifying the necessities level (*daruriyyat*), which can serve as a reference for welfare programs, minimum wage rate determination, poverty eradication efforts, and more. The equilibrium point serves as a vital reference for policymakers evaluating the efficacy of their interventions in the charitable sector. For instance, the impact of tax incentives or government social welfare programs can be gauged by examining

their effects on the equilibrium value and quantity of charity. Policies propelling the market toward equilibrium are deemed more successful in addressing recipient needs and encouraging donor willingness to give. Moreover, determining the equilibrium income ( $I_e$ ) is essential in poverty eradication efforts. This reference measure aids in shaping welfare programs such as public transfer programs, minimum wage policy, and poverty alleviation programs or *zakāt* distribution. Notably, the  $I_e$  point can also serve as the poverty line income.

While the model demonstrates robustness and offers profound insights, it acknowledges inherent limitations, such as in the use of slightly outdated HIS 2009 dataset for the empirical estimations. Nonetheless, it has laid an intuitive foundation for future research, inviting refinement and expansion by incorporating additional variables and recent dataset.

This study utilizes 2009 HIS data because of data access constraints during research. Since then, several developments warrant investigation using more recent datasets. Malaysia's household income structure has evolved significantly, with median household income increasing from RM2,841 in 2009 to RM6,338 in 2022 (Department of Statistics Malaysia, 2023). Recent economic shocks, particularly the COVID-19 pandemic, have likely altered charitable giving patterns and basic needs requirements. Future research using newer HIS datasets could validate the market-clearing charity model's robustness across different economic conditions and examine how rising living costs and income inequality affect charitable behavior. Extending the analysis to individual-level data could provide deeper insights into personal charitable decisions, complementing the household-level findings presented in this study. Such expanded analysis would enhance understanding of the charitable market in contemporary Malaysian society at both household and individual levels, providing updated policy implications, especially when integrated with current frameworks such as Bank Negara Malaysia's living wage concept.

## REFERENCES

- Ackerman, F. "What is the Proper Role for Charity in Healthcare?" *Cambridge Quarterly of Healthcare Ethics* 5, no. 3 (1996): 425–29.
- Andreoni, J. "Impure Altruism and Donations to Public Goods: A Theory of Warm-Glow Giving." *The Economic Journal* 100, no. 401 (1990): 464.

- Andreoni, J., and A.A. Payne. "Charitable Giving" in *Handbook of Public Economics*. Elsevier (2013): 1–50.
- Ahmad, I.H.J., and M. Ma'in. "The Efficiency of Zakat Collection and Distribution: Evidence from Two Stage Analysis." *International Journal of Economics, Management and Accounting* 22, no. 1 (2014): 33-50.
- Arshad, M.N.M. "Determinants of Charitable Giving in Malaysia." *Humanomics* 32, no. 4 (2016): 459–73.
- Arshad, M.N.M. "Conceptualizing the Islamic Social Finance into a Three-Sector Economic Model" In *Institutional Perspectives in Islamic Economics.*, edited by A. Shafiq. Routledge (2022).
- Arshad, M.N.M., and M.A. Haneef. "Third Sector Socio-Economic Models: How Awqaf Fit In?" *Institutions and Economics* 8, no. 2 (2016): 72–90.
- Aziz, S.A., R.M. Amin, S.A. Yusof, M.A. Haneef, M.O. Mohamed, and G. Oziev. "A Critical Analysis of Development Indices." *Australian Journal of Sustainable Business and Society* 1, no. 1 (2015): 37–53.
- Bekkers, R., and P. Wiepking. "A literature review of empirical studies of philanthropy: Eight mechanisms that drive charitable giving." *Nonprofit and Voluntary Sector Quarterly* 40, no. 5 (2011): 924–73.
- Bekkers, R. and T. Schuyt. "And Who is Your Neighbor? Explaining Denominational Differences in Charitable Giving and Volunteering in the Netherlands." *Review of Religious Research* (2008): 74–96.
- Bekkers, R., and P. Wiepking. "Who Gives? A Literature Review of Predictors of Charitable Giving Part One: Religion, Education, Age, and Socialisation." *Voluntary Sector Review* 2, no. 3 (2011): 337–65.
- Biederman, D.K. "Matched Charitable Contributions: Comparative Statics and Equilibrium." *Theoretical Economics Letters* 3 (2013) 283–87.
- Brehm, C.T. and T.R. Saving. "The Demand for General Assistance Payments." *The American Economic Review* (1964): 1002–018.
- Charette, M. and R. Meng. "The Determinants of Welfare Participation of Female Heads of Household in Canada." *Canadian Journal of Economics* (1994): 290–306.
- Chong, E., and F. Adam Khong. The living wage: Beyond making ends meet. In *Bank Negara Malaysia Annual Report 2017*, Bank Negara Malaysia (2018): 51-7.

- Cornes, R. and T. Sandler. “Are Public Goods Myths?” *Journal of Theoretical Politics* 6, no. 3 (1994): 369–85.
- Cox, D., and E. Jimenez. “Achieving social objectives through private transfers: A review.” *World Bank Research Observer* 5, no. 2 (1990): 205–18.
- Cummins, R.A. “Personal Income and Subjective Well-Being: A Review.” *Journal of Happiness Studies* 1, no. 2 (2000): 133–58.
- Department of Statistics Malaysia. (2023). *Reports of Household Income Survey and Household Expenditure Survey Malaysia, 2022*. Department of Statistics Malaysia. <https://www.dosm.gov.my/portal-main/release-content/household-income-survey-report--malaysia--states>
- Einolf, C. and Chambré, SM. “Who Volunteers? Constructing a Hybrid Theory.” *International Journal of Nonprofit and Voluntary Sector Marketing* 16, no. 4 (2011): 298–310.
- Hargaden, E.P., and N.J. Duquette. “The U-shaped Charitable-Giving Curve.” *Nonprofit and Voluntary Sector Quarterly* 53, no. 4 (2024): 1057-073.
- Hassan, M.K., and M. Ahmed. “Poverty Alleviation through Zakat and Waqf Institutions: A Case for the Muslim World.” *International Journal of Economics, Management and Accounting* 20, no. 1 (2012): 113-43.
- Ibrahim, H., and A.G. Ismail. “Maqasid Al-Shariah Based Measurement Index for Socio-Economic Development: A Case Study in Malaysia.” *International Journal of Economics, Management and Accounting* 23, no. 2 (2015): 123-59.
- Jones, A. and J. Posnett. “Charitable Donations by UK Households: Evidence from the Family Expenditure Survey.” *Applied Economics* 23, no. 2 (1991): 343–51.
- Kitchen, H. “Determinants of Charitable Donations in Canada: A Comparison Over Time.” *Applied Economics* 24, no. 7 (1992): 709–13.
- Lankford, R.H. and J.H. Wyckoff. “Modeling Charitable Giving Using a Box-Cox Standard Tobit Model.” *The Review of Economics and Statistics* 73, no. 3 (1991): 460.
- List, J.M. “Beyond Charity: Social Justice and Health Care.” *AMA Journal of Ethics* 13, no. 8 (2011): 565–68.
- McLaughlin, M. and M.R. Rank. “Estimating the Economic Cost of Childhood Poverty in the United States.” *Social Work Research* 42, no. 2 (2018): 73–83.

- Mohsin, M.I.A. "Financing through Cash-Waqf: A Revitalization to Finance Different Needs." *International Journal of Islamic and Middle Eastern Finance and Management* 6, no. 4 (2013): 304–21.
- Putnam, R. *Bowling Alone: The Collapse and Revival of American Community*. Simon and. New York, 2000.
- Reece, W.S. "Charitable Contributions: New Evidence on Household Behavior." *The American Economic Review* 69, no. 1 (1979): 142–51.
- Roberts, R.D. "A Positive Model of Private Charity and Public Transfers." *Journal of Political Economy* 92, no. 1 (1984): 136–48.
- Rubin, P.H. "Managing the Public's Business: Economic and Social Choice." *Journal of Institutional and Theoretical Economics* 43, no. 1 (1987): 1–21.
- Ruffin, R.J. and D.E. Leigh. "Charity, Competition, and the Pricing of Doctors' Services." *Journal of Human Resources* (1973): 212–22.
- Saccardo, S., C.X. Li, A. Samek, and A. Gneezy. "Nudging Generosity in Consumer Elective Pricing." *Organizational Behavior and Human Decision Processes* 163 (March) (2021): 91–104.
- Salamon, L.M. "Putting the Civil Society Sector on the Economic Map of the World." *Annals of Public and Cooperative Economics* 81, no. 2 (2010): 167–210.
- Sandoval, D.A., M.R. Rank, and T.A. Hirschl. "The Increasing Risk of Poverty Across the American Life Course." *Demography* 46 (2009): 717–37.
- Taylor-Gooby, P., J.M. Gummy, and A. Otto. "Can "New Welfare" Address Poverty Through More and Better Jobs?" *Journal of Social Policy* 44, no. 1 (2015): 83–104.
- Tridico, P., and P.M. Walter. "Economic Growth, Welfare Models and Inequality in the Context of Globalisation." *The Economic and Labour Relations Review* 29, no. 1 (2018): 118–39.
- Wiepking, P. and Handy, F. *The Palgrave Handbook of Global Philanthropy*. London: Palgrave Macmillan, 2015.
- Wiepking, P. "Democrats Support International Relief and the Upper Class Donates to Art? How Opportunity, Incentives, and Confidence Affect Donations to Different Types of Charitable Organizations." *Social Science Research* 39, no. 6 (2010): 1073–087.

- Wit, A.D., and R. Bekkers. “Government Support and Charitable Donations: A Meta-Analysis of the Crowding-Out Hypothesis.” *Journal of Public Administration Research and Theory* 27, no. 2 (2017): 301–19.
- Yusof, S.A., M.A. Budiman, R.M. Amin., and A. Abideen. “Holistic Development and Wellbeing Based on Maqasid Al-Shari’ah: The Case of South Kalimantan, Indonesia.” *Journal of Economic Cooperation and Development* 40, no. 4 (2019): 1–21.
- Yen, S.T. “An Econometric Analysis of Household Donations in the USA.” *Applied Economic Letters* 9, no. 9 (2002): 837–41.

**APPENDIX 1**

## Descriptive Statistics of the Dependent Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
<i>moneygive</i>	2780	3242.496	6761.992		207370
<i>INCS05</i>	2780	1714.602	4707.471		125500

**APPENDIX 2**

## Descriptive Statistics of the Independent Variables

Variables	Variable notation	Definition	Statistics	All
Earnings	Earn	Yearly earnings (RM)	Mean Std dev Min Max	25,937 29,034 120 1,102,000
Age	Age	Age	Mean Std dev Min Max	35.3 12.9 16 60
Married	Marry	Married (=1 if married)	No %	22,751 69.04
Male	Male	Male (=1 if male)	No %	16,264 49.35
Bumiputra	Bumi	Base category	No %	23516 71.36
Chinese	Chinese	Dummy (=1 if Chinese)	No %	6800 20.63
Indian	Indian	Dummy (=1 if Indian)	No %	2132 6.47
Other ethnics	Others	Dummy (=1 if other ethnics)	No %	506 1.54
Urban	Urban	Dummy (=1 if urban)	No %	18568 56.35



## **EXPLORING MOSQUES IN SELANGOR: THEIR ROLE AS HUBS FOR LOCAL ECONOMIC ACTIVITIES**

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### **ABSTRACT**

Historically, mosques can function as centers for community economic development, drawing from their historical role dating back to Prophet Muhammad's (*sal-Allāhu 'alayhi wa sallam*) era. The study specifically investigates how mosques in Selangor are contributing to community sustainability through various microeconomic initiatives. By employing a qualitative study, the derivation of the primary data is based on in-depth interview and open-ended questions to obtain information regarding the execution of the mosque economic activities. The interview sessions were conducted with the mosques' management within Selangor district. In addition, the secondary data were based on the library research which consist of analyzing books, journals, fatwas, websites as well as newspapers related to the contribution of mosques in facilitating social economy. The result indicates that the execution of the microeconomic-based mosque has impacted positive social economic activity among people who live in Selangor area. This turns the opportunities for the local people to get involved in small and medium entrepreneurship and reducing unemployment there. Also, the idea of developing the mosque as one stop center for the society to perform economic activities was highly recommended by the authorities. This finding demonstrates how mosques in Selangor can be effectively transformed into vital centers for community economic development. This

study has the potential to be the pioneer in addressing the necessity of enlarging the role of the mosques as a centre of microeconomic development.

JEL Classification: D60, O12, O20.

Keywords: Mosque, Microeconomy, Selangor, Development, Society

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## 1. INTRODUCTION

Mosques have long served as pivotal institutions within *Muslim* societies, extending their role far beyond the realm of religious practice. Since the era of the Prophet Muhammad (*ṣal-Allāhu 'alayhi wa sallam*), mosques have been integral to human resources development and have played a crucial role in enhancing the social and economic well-being of the community. Recognizing this historical significance, the present study seeks to explore the evolving role of mosques as centers for microeconomic development, with a particular focus on several mosques in Selangor, a state in Malaysia.

Mosques in Selangor comprise two categories: Royal Mosque and Community Mosque (*Kariah* Mosque). Both categories have their criteria provided by the authority that governs mosque management, namely the Selangor Islamic Religious Council. From the finding through this study, it is evident that both categories have been a center for economic building based on a microeconomy nature, with different challenges addressed.

This study delves into the experiences and impacts of microeconomic activities facilitated by mosques in Selangor. Findings from the research reveal that the implementation of microeconomic activities within mosques has positively influenced the socio-economic development of the Selangor region. This initiative has created opportunities for local communities to engage in small and medium-sized enterprises, thereby contributing to reduced unemployment rates. The study also highlights the strong endorsement from authorities regarding the development of mosques as central hubs for economic activities within the community.

The practical implications of this study suggest that mosques and *Islāmic* institutions hold significant potential to serve as centers for economic growth and community development. By showcasing the success of these microeconomic initiatives, the study aims at pioneering a new perspective on the role of mosques, advocating for

an expanded recognition of their capacity to drive economic progress and improve social welfare. Overall, this research contributes to the existing body of knowledge by underscoring the necessity of broadening the role of mosques as facilitators of microeconomic development, positioning them as vital players in the economic and social fabric of their communities.

## 2. LITERATURE REVIEW

### 2.1 THE DIVERSE FUNCTIONS OF MOSQUES DURING THE PROPHETIC ERA

The Arabic term for the mosque is *masājīd* (pl. *masājīd*) which is mentioned 27 times in the *Qur'ān*: 21 times as a singular noun and six times as plural noun. Both 'mosque' and *masājīd* are used exclusively for a building dedicated to *Islāmic* worship. However, the latter has a broader meaning. *Islāmic* history proves that mosques have a central function in the lives of *Muslims* (Koehrsen, 2021). During the arrival of Prophet Muhammad (*ṣal-Allāhu 'alayhi wa sallam*) in Madinah, the first and immediate task relating to the built environment, as well as to the community building process, that he embarked on fulfilling was building the city's central mosque, also called the Prophet's Mosque (Al-Masjid An-Nabawi). The mosque was not only intended for religious activities (prayers) but also served as centers for conducting other activities, whether in the form of social welfare, socio-economic matters, or even as administrative centres (Safei and Armstrong, 2023; Jamsari et al., 2010), a place to resolve health problems, economic management of the *ummah*, military training, and war preparation (Agus Kurnia et al., 2020).

According to Sulaiman (2014), from only serving as a place of worship to the society, the Prophet Muhammad (*ṣal-Allāhu 'alayhi wa sallam*) has optimized the mosque's function as a center of knowledge and education, intellectual discourse, preaching center and social function. Furthermore, Ritonga and Wijaya (2022) delineate that dynamics of life and human problems were discussed and resolved at the mosque. The Prophet's Mosque was the first and undeniably most outstanding *Islāmic* center of learning. There under the Prophet's vigilant eye studied the generation, both men and women, as mentioned in the Holy *Qur'ān* 48:29). Based on this verse, Sulayman (2017) noted that during the prophetic era, the mosque used to be where the companions memorized the *Qur'ān*, transmitting the

prophetic traditions (*ḥadīth*) and shaping the life of the young generation.

Apart from that, during the prophetic era, the Al-Masjid An-Nabawi played the role of the seat of the first *Islāmic* government. The Prophet (*ṣal-Allāhu 'alayhi wa sallam*) used to spend long hours on a daily basis discussing, deciding and executing many affairs related to administering the state. *Jihad* (striving in the way of God) and state defence strategies were also initiated and concluded in the mosque. The Prophet's Mosque also served as a welfare and charity center. There, the poorest companions of the community resided. A shaded structure called *suffah* (a raised platform or bench) was erected for them in a corner of the northern side of the Mosque. Those people were called *ahl al-suffah* or the "People of the *suffah*". The 'People of the *suffah*' would frequently go out to perform whatever work they could find in order to procure their sustenance. They actively participated in *jihad* and some of them died as martyrs on different battlefields. Notwithstanding their difficult state, they abhorred remaining a liability to the community.

The Prophet's Mosque partly functioned as a detention and rehabilitation center. However, many aspects of this role remained shrouded in a number of ambiguities. It is reported that a man called Thumama ibn Uthal from the Bani Hanifah clan in Najd was captured and fastened to one of the pillars of the Mosque. The Prophet (*ṣal-Allāhu 'alayhi wa sallam*), however, later ordered some of his people to release him. The man thereupon went to a garden next to the Mosque, took a bath and entered the mosque proclaiming *shahadah*, i.e., he embraced *Islām* (Al-Bukhari, 2009). There was occasionally a place reserved for medical treatment and nursing as well. A tent or more at times were erected for the purpose. On the day of the battle of the Ditch (*al-khandaq*), a companion Sa'd ibn Mu'adh was injured, and the Prophet (*ṣal-Allāhu 'alayhi wa sallam*) pitched a tent in his mosque so that he could be looked after properly. Besides, the Prophet (*ṣal-Allāhu 'alayhi wa sallam*) wanted to be near his friend and close companion so as to visit him on a regular basis and monitor his condition (Al-Bukhari, 2009).

The mosque of the Prophet (*ṣal-Allāhu 'alayhi wa sallam*) was a place where some sport and recreation activities were occasionally held, both inside and outside it. A'ishah, the Prophet's wife, narrated that once during an Eid festival, she saw the Prophet (*ṣal-Allāhu 'alayhi wa sallam*) at the door of their house watching some Ethiopians who were playing in the Mosque proper displaying

their skill with spears, whereupon she joined him (Al-Bukhari, 2009). Also, some companions of the Prophet (*ṣal-Allāhu 'alayhi wa sallam*) would sometimes practise archery inside the Mosque in the Prophet's presence till the full darkness descended and the targets were no longer visible, as reported by al-Bukhari (2009).

## 2.2 THE ADMINISTRATION OF MOSQUE IN SELANGOR

The mosques in Selangor have a rich history of development, serving not only as places of worship but also as reflections of the local community's culture (Saifulamri et al., 2024). The designation of mosque has been placed under the right of the Selangor Islamic Religious Council (MAIS), as stipulated in the Selangor Islamic Administration Enactment (State of Selangor) 2003. It is stated in the Section 96(2), each mosque, along with its site and any land connected to and used for the purposes of that mosque, except for government land or land reserved for public purposes, shall, as soon as it is registered under written laws relating to land, and without any transfer, surrender, or conveyance, vest rights in the Council for the purposes of this Enactment.

No institution or individual would have the authority to build, erect building for matters than can only be done at or by a mosque, unless they received written permission from the Council, as maintained by Section 97(1) of the said enactment. For the Section 98(1), the Council is the authorized to permit a building to be erected for use as a mosque, allow the use of any building as a mosque, and designate any prayer hall, school, or other building as a mosque.

Based on the Section 99(1) and (2), the Council must ensure that all mosques in the state of Selangor are in proper condition and that their surroundings are maintained in a clean state, and may obtain and use, or allow the acquisition and use of, special funds for the purpose of repairing and maintaining mosques, or it may cover the costs of such repairs and maintenance from the Baitulmal. Apart from this, the Council also has the authority for the administrator and mosque officer appointment. This is based on the Section (100)(1)(2)(3), which maintains the responsibility of the Council to appoint them. The important criterion for this appointment is the officer should be part of the civil servant who serves the state government or any qualified candidate who is adequate for the appointment.

This enactment aims at enhancing the management of mosques in Selangor. Consequently, in its implementation, mosques are classified as Royal Mosque (*Masjid Di Raja*) and Community Mosque (*Masjid Kariah*) (<https://mais.gov.my/>). Both categories have divergent roles in manifesting the functions of the mosque in Selangor, resulting in different impact to society, particularly for economic building of the community.

Under the 2003 Selangor Islamic Administration Enactment, MAIS (Selangor Islamic Religious Council) maintains sole responsibility for mosque classification in Selangor. This regulatory framework, designed to strengthen mosque administration, establishes various categories of management mosques, specifically:

- All Royal Mosques in the State of Selangor
- All Community Mosques
- Some newly constructed mosques
- Some community mosques facing issues and conflicts with community members.

Any decision to designate a mosque as falls under the jurisdiction of the Mosque and *Surau* Governance Committee of Selangor (JATUMS), established to represent MAIS in fulfilling its responsibilities, duties, or exercising its powers according to Section 27 of the Selangor Islamic Administration Enactment 2003 (Amendment 2016). Section 104(1) of the Selangor Islamic Administration Enactment 2003 provides that the Council may, with the approval of His Royal Highness the Sultan, make regulations for:

- The establishment of a Community Committee for a mosque;
- The establishment, appointment, and termination of the Mosque Management Committee, and the functions of the Mosque Management Committee.

Section 104(3) of the Selangor Islamic Administration Enactment 2003 states. notwithstanding anything contained in this Enactment, the council may, for the smoothness and benefit of the administration of a mosque and *surau* or for any other reason as may be determined through regulations made under this Enactment

:

- Establish a Mosque Management Committee for a community mosque or establish a Surau Management Committee for a community surau; or
- Cancel the establishment of any community committee for a mosque or cancel the establishment of a Surau Committee and instead establish a Mosque Management Committee or a Surau Management Committee with any terms and conditions deemed appropriate and proper.”

### 2.3 MOSQUE’S PROSPECT FOR ECONOMIC BUILDING

The diverse functions of mosques have made them the most revered institutions. Besides congregational prayers, which are the primary activity of mosques, various activities based on education, community, administration, sports, and even entrepreneurship can be developed through the mosque institution (Che Omar et al., 2015). Topic regarding enhancing mosque’s role as a driver of economic activity and the development of the *Muslim* community is a theme that has almost disappeared from dictionaries and discussion lists of the *Muslim* community’s ecosystem. In fact, in the view of half of the parties, such themes and titles should not be announced in order to maintain the integrity and sanctity of the institution (Bakar, 2019). In conjunction with rejuvenating the impact that any mosque could deliver, some eighty-nine mosques seemed to have potential of being centers of enlivening mosque’s atmosphere and economic activities (Sinar Harian, November 17, 2020). Based on this spirit, more than 1 million persons have received financial assistance regardless of their backgrounds.

Today, many mosques are starting to carry out economic activities to optimize the function of mosques in helping the local community (Ismail, 2022). Raga Utama et al. (2018) stress that empowerment could be in the form of business capital assistance to increase people’s income and avoid *ribawi* practices. For instance, Masjid Umm al-Mukminin located in Surabaya, Indonesia offers financing to the society. The financing recipient must pay the instalment to the mosque as the fund without additional cost or payment.

Mosques also become the center of aiding poor and needy people in financial aspect. The fund is based on the public donations and certain economic initiatives, such as mosque cooperative, wedding equipment rentals, catering, dining halls, and other services

that can meet the community needs and aspirations (Abdul Rahman et al., 2019). These initiatives will open the opportunities for the local community to involve in small and medium businesses to support them financially. According to Ismail (2022), besides encouraging the mosque in a spiritual way, *mu'amalat* and economic activities can also be carried out to increase funds and finance all mosque activities without having to rely on the government. One of the ways to invigorate this initiative is by the establishment of a mosque cooperative as a catalyst for economic development. Masjid Nurul Yaqin Cooperative is registered under the Malaysia Cooperative Societies Commission (MCSC) and since 2015, it has involved in various economic activities and branding as follows:

TABLE 1  
Economic Activities by Masjid Nurul Yaqin Cooperative

No.		Activities
1.	Yaqin Bina	It is established to undertake construction sector involving maintenance and development works. Until 2021, it has reached RM 1.3 million from this business.
2.	Yaqin Travel	The establishment of this travel agency received cooperation with other's travel agencies in which its objective is to organize tourism activities for the member, local community as well as their family members.
3.	Yaqin Café	The operation of this cafe started in 2017. The establishment aims at preparing breakfast for the participant of <i>subuh</i> prayer in congregation.
4.	Yaqin Catering	The operation of this catering is to serve dinner course and prepare cuisine for <i>iftar</i> (breaking the fasting) during Ramadan.
5.	Yaqin Mart	The idea of this mart is to be one stop centre in promoting local products involving basic necessary items for the community to purchase with affordable prices.

Source: Created by the authors

In addition, the economic project carried out by Taman Desa Ilmu Mosque in Kota Samarahan, Sarawak, implements fertigation on chili cultivation using Internet of Things (IoT) technology. With a capital of RM5,000, this project generates a harvest of up to 45 kilograms (kg) of chillies for one harvest for 1,000 trees with a market price of chillies and rice of RM30 per kilogram. Through this project,

Taman Desa Ilmu Mosque generates up to RM1,350 for a single harvest (Berita Harian, January 13, 2022).

In Indonesia, mosques have a strategic function in *Islāmic* society. In addition to being a place of worship, the mosque also serves as a medium of holistic development of people (Wahab et al., 2021). Mosques have been community development and empowerment centers. For instance, Jogokariyan Mosque has initiated certain economic-based programs in helping the local community to improve their financial flow especially during the COVID-19 pandemic. The following initiatives were done by the mosque.

The aforementioned points demonstrate that mosques have the potential to serve as hubs for economic development, with benefits flowing back to the community. This reflects the spirit emphasized by *Islām* since the establishment of the mosque in *Quba'*. This historical precedent underscores the idea that mosques can and should be catalysts for economic development today, echoing the principles of community benefit and social responsibility emphasized in *Islāmic* teachings.

### 3. RESEARCH METHODOLOGY

#### 3.1 RESEARCH DESIGN

This study employs a qualitative approach, and it involves the library method of data collection and semi-structured interviews. The qualitative study consists of five main designs: narrative, phenomenology, grounded theory, ethnography, and case study. This study focuses on one of the research designs, which is the grounded theory. According to Corbin and Strauss (1990), a grounded theory is one that inductively derived from the study of the phenomenon it represents. That is, it discovered, developed, and provisionally verified through systematic data collection and analysis data pertaining to that phenomenon. Therefore, data collection, analysis, and theory stand in reciprocal relationship with each other. In addition El Hussein et al. (2014) explains that the characteristics of this research design are it is developed from the particular issues or phenomenon, the arrangement of the theory must be in form of inductive data collection, and it must fulfil its purposes; fit, understanding, generality and control.

TABLE 2  
Economic activities by Jogokariyan Mosque, Indonesia

No.	Initiative of the mosque	Description
1.	Program for less unfortunate	<p>The mosque made a special program for the poor. This program is specifically for the poor who are considered not to have the ability to make more efforts to improve their economy. Therefore, the mosque must create a program that helps directly for the sustainability of the life of its poor congregation.</p> <p>a. Rice ATM Rice ATM or Rice Automated Pavilion. This rice ATM program is a gift of rice for the poor. The rice ATM can be accessed by Jogokariyan Mosque congregations every day. In this rice ATM program, according to Welly, as the administrator of the Jogokariyan Mosque, the mosque has provided approximately four tons of rice every month for the poor and needy. Currently, there are 425 rice ATM recipients registered at the Jogokariyan Mosque.</p> <p>b. Even though they are able to try to meet the needs of daily life, entrepreneurs experience obstacles in continuing their business. The problems faced by the Jogokariyan Mosque are the lack of business capital and the lack of buyer interest during the Covid-19 pandemic.</p> <p>To solve the congregation's business problems, the Jogokariyan Mosque holds a people's market around the mosque every Saturday and Sunday after <i>subuh</i> prayers. The people's market of the Jogokariyan Mosque has the motto “<i>Dari masjid rakyat bangkit, segera merdeka dari belenggu COVID</i>”. With the existence of this people's market, it is hoped that it will be able to overcome the problems of the congregations MSMEs.</p>

TABLE 2 (continued)

No.	Initiative of the mosque	Description
2.	<i>Al-Qard al-Hasan</i> loan	<p>a. Business capital is one of the main problems faced by people's market participants; therefore, the Jogokariyan Mosque makes business capital loans for people's market participants. In contrast to other lenders who increase the loan amount when repaying it, the Jogokariyan Mosque provides <i>Al-Qard</i> loans to market participants.</p> <p>b. This business capital loan makes it easier for participants to start a business or those who want to develop their business for the better. This business capital is used by some market participants to buy raw materials or carts to make it easier for sellers to move their goods to those who live far from the mosque environment. This is because most of the participants in the people's market are those who have just opened a business and have not had the preparation in doing business, so the mosque provides business capital loans and education about entrepreneurship.</p>
3.	Program for the entrepreneurship starter	The Jogokariyan Mosque provides free stalls and also does not charge fees for the local entrepreneur participating in the people's market. The absence of fees for participating in the people's market will certainly reduce the burden on the people's market participants. Without this fee, all participant benefits can be enjoyed by participants without the need to incur additional costs from their business results.

Source: Created by the authors

For the interview, the respondents were given a set of open-ended questions, as it gives flexibility to them to answer the questions. Empirical data is considered as the primary source of this study. A semi-structured interview is a verbal interchange where one person, the interviewer attempts to elicit information from another person by asking questions, according to Longhurst (2023). The principle of this kind of interview is so that the main narrative is produced independently by the interviewees, even if in particular cases it is framed rather in the style of a brief report or a piece of argumentation (Hopf, 2004).

### 3.2 DATA COLLECTION

To fulfil the theoretical framework part, this study requires library research as it relied upon the various sources from the classical sources as the major references and the contemporary discourses. Both approaches are applied in this study by referring to books, journals, newspapers, policies as well as the point of views from the scholars. To arrive at a conclusion from the data gathering, library data were analyzed using the content analysis method. Content analysis is described as a method that falls in the interface of observation and document analysis (Prasad, 2008). It is any technique for making inference by systematically and objectively identifying specified characteristics of messages.

The interview session was conducted using semi-structured interviews with individuals involved in mosque management. It is important to understand that mosques in Selangor are categorized into three types: Royal Mosque, State Mosque, and *Kariah* Mosque (community). The Selangor Islamic Religious Council has the authority to classify these categories, each of which has distinct roles. This study examines all three categories to provide comprehensive and reliable insights, as each type of mosque has a different impact on socio-economic development. Additionally, the study employed a sample approach to focus on practical aspects while keeping the sample size manageable.

The respondents were selected based on the areas of specialization associated with the topics discussed throughout the research. On top of that, respondent selection was based on the mosques' experience in operating microeconomic activities. Five experienced officials who served in the mosque management were chosen for their insight into the matters. Furthermore, considering

their position, this study believes that all respondents can give their contribution in making this study impactful.

The field data were analyzed via a thematic analysis approach. Thematic analysis approach is a method for identifying, analyzing and interpreting patterns of meaning or ‘theme’ within qualitative data. Using thematic analysis is important in this qualitative study as it provides accessible and systematic procedures for generating themes where it provides a framework for organizing and reporting the researcher’s analytic observation (Clarke and Braun, 2017). The approach borrows what some other researchers feel are the more useful techniques from each theoretical and methodological camp and adapts them to an applied research context (Guest et al., n.d). Other than that, this approach is suitable for this research as it provides flexibility for the researcher to communicate with the selected respondents.

TABLE 3  
List of Respondents

Interviewees	Designation	Mosque	Category
IR1	Head of Imam	Masjid Bandar Seri Putra, Kajang, Selangor.	<i>Kariah</i> Mosque (Community Mosque)
IR2	Head of Mosque Management Unit	Masjid Al-Hasanah, Bandar Baru Bangi, Selangor	<i>Kariah</i> Mosque (Community Mosque)
IR3	Manager	Masjid Tengku Ampuan Jemaah, Bukit Jelutong, Selangor	Royal Mosque
IR4	Manager	Masjid Raja Haji Fi Sabilillah, Cyberjaya, Selangor	<i>Kariah</i> Mosque (Community Mosque)
IR5	Head of Imam	Masjid Sultan Salahuddin Abdul Aziz Shah, Shah Alam, Selangor	Royal and State Mosque

## 4. FINDINGS

### 4.1 MOSQUES AS MAIN CENTRE FOR SOCIAL FUNCTIONS

Based on the interview, IR1 emphasised the crucial roles played by mosques in developing sustainable communities. The respondent emphasized that mosques should be at the forefront of community support, serving as both a reference point and a foundation for social and entrepreneurial programs. According to IR3, society increasingly turned to mosques during the COVID-19 pandemic, establishing them as key support institutions as a role that continues to the present day. IR1 outlined several activities organized by mosques in Selangor. For instance, Masjid Bandar Seri Putra has diversified its offerings to include religious studies, *silat* (a traditional Malay martial art), *talaqqi* sessions (traditional learning method), and an “APEL Certificate” (Accreditation of Prior Experiential Learning) accredited by MQA (Malaysian Quality Assurance) for advanced studies. Additionally, the mosque serves as a community reference center through its public library and website for religious information access. Masjid Bandar Sri Putra also provides entrepreneurship guidance for local entrepreneurs through collaborations with Bank Muamalat, Bank Rakyat, and the *zakāt* center.

IR2, representing Masjid Al-Hasanah management, noted that while religious teachings and forums attract community participation, their activities extend beyond these traditional roles. The mosque has optimized its surrounding areas for various commercial ventures, including café and dining services, a car wash center, and other business spaces. These economic activities, managed by the mosque's cooperative and economic bureau, aim at creating employment opportunities for the local community.

According to IR3, Masjid Tengku Ampuan Jemaah played a vital role in providing financial assistance and essential support to those affected by the pandemic. The mosque expanded its humanitarian activities to flood-affected areas across Malaysia, including Sabah, Pahang, and Kedah. With its active volunteer base, the mosque also collaborates with Selangor hospitals to organize blood donation campaigns, promoting awareness and supporting hospital blood banks.

IR4, representing Masjid Raja Haji Fi Sabilillah, acknowledged the importance of community engagement. The mosque functions as a comprehensive center offering religious

classes, professional entrepreneurship training, and employment opportunities, while maintaining its welfare support through *zakāt* distribution and financial assistance for orphans and underprivileged communities. Similarly, Masjid Sultan Salahuddin Abdul Aziz Shah implemented the Social Responsibility Consent (SRC) concept, providing direct assistance to 91 *asnaf* (*zakāt*-eligible individuals).

#### 4.2 MICROECONOMY-BASED MOSQUES AND LOCAL COMMUNITY ECONOMIC BUILDING

Based on the interview, IR1 explained the mosque's economic plan for developing the *Muslim* community, which was officially structured in 2024. The mosque currently focuses on entrepreneurship programs across various fields alongside establishing a cooperative. These entrepreneurship initiatives include product development, marketing, and business management training. The mosque also offers digital advertising and financial management services, as well as *qard al-hasan* loans to eligible individuals. The entrepreneurship program benefits from collaboration with Bank Muamalat, and participants receive ongoing monitoring throughout the program. Masjid Bandar Seri Putra also welcomes community participation by allowing vendors to sell their products at the mosque.

According to IR2, Masjid Al-Hasanah implements its local economic development strategy through two main channels: the Economic Bureau and the mosque cooperative, both regulated by the mosque's board. These entities work complementarily, with the cooperative's initial funding coming from the Economic Bureau. To support the community, the mosque provides business spaces for local microeconomic activities. Business owners can rent various facilities, including shop lots, vending machine spaces, and cabins.

IR3, IR4, and IR5 presented a different approach to creating economic sustainability for the local community. As royal and state mosques, their management must adhere to specific regulations set by the Selangor Religious Islamic Council. These mosques leverage existing facilities such as wedding halls, seminar rooms, and multipurpose halls to create job opportunities for the community. They allow local business owners to participate in the mosque's bazaar without charging fees. Additionally, IR4 noted that the mosque organizes business training and courses to support individuals starting or expanding their businesses. The management also makes facilities available to catering service providers at negotiable rates.

#### 4.3 THE COMPETENCY OF MOSQUES TO INVOLVE IN THE SOCIAL ECONOMIC DEVELOPMENT

Based on the interview, all respondents agreed that mosques' ability to respond quickly and efficiently to economic issues and opportunities demonstrates their operational agility. This competency ensures timely assistance and implementation of programs that positively impact the community's economic well-being. Furthermore, by partnering with external agencies, the mosques can leverage additional resources, expertise, and support networks, enhancing their capacity to develop and execute more comprehensive and impactful economic development programs.

IR1 emphasized the essential role of mosques in encouraging economic development within the *Muslim* community. Masjid Bandar Seri Putra supports the local community by creating micro-entrepreneurship opportunities through its funding initiatives. For example, the mosque offers grants to *Sijil Pelajaran Malaysia* (Malaysia Certificate of Education) graduates who are not pursuing further studies but are interested in starting online businesses. The mosque has allocated RM10,000 to support 10 applicants, with two individuals already receiving a RM1,000 grant each. One beneficiary has successfully launched a nasi lemak business. Beyond financial support, the mosque provides entrepreneurship training to educate recipients about business management.

According to IR2, Masjid Al-Hasanah supports the local community by providing affordable rental spaces, including shop lots, cabins, and vending machine locations. These strategic locations help vendors and business owners sustain their businesses, as mosques naturally attract regular foot traffic. The mosque has also established a cooperative under its management, allowing both entities to coordinate economic activities and create channels for microentrepreneurs to become vendors or suppliers.

IR3 and IR5 noted that despite their status as royal and state mosques and the strict regulations from religious authorities, their institutions continue to support local entrepreneurial activities. Both mosques utilize their facilities by providing spaces, halls, rooms, and bazaar lots to local business owners, charging minimal fees for most facilities and offering bazaar spaces free of charge.

#### 4.4 CHALLENGES FACED BY THE MOSQUES MANAGEMENT DURING INITIATING SOCIAL ECONOMIC DEVELOPMENT AGENDAS

The respondents identified several key challenges in building social economic development through microeconomic-based mosques. A primary challenge is insufficient personnel to coordinate business activities run by participants. The respondents emphasized the need for greater involvement from committee members and volunteers. IR1 specifically noted that their recently developed entrepreneurship program requires strong community support to succeed.

IR2 highlighted a second challenge: the absence of specific *fatwa* guidelines in Selangor regarding mosque trading activities. This lack of clear religious rulings leaves mosque management and local communities uncertain about the Shari'ah perspective on conducting business within mosque premises, leading to frequent inquiries about permissibility.

Committee member rotation presents another significant challenge. According to IR1 and IR3, Selangor Mosque committee members serve three-year terms, which differs from cooperative committee appointments. While cooperatives can maintain operations despite committee changes after selection meetings, mosque management transitions often result in shifting directions that may lead to declining economic activities.

IR4 identified multiple operational challenges:

- Limited financial resources for executing and sustaining economic initiatives
- Shortage of trained and experienced personnel in economic development
- Inadequate knowledge and skills among mosque committee members
- Insufficient community participation in organized initiatives

IR5 emphasized that stakeholder constraints pose the biggest obstacle for state mosques. Under the control of the Selangor State Islamic Religious Department, these mosques cannot generate business income directly and are limited to managing existing assets and infrastructure. This creates a distinct economic model compared to community mosques, which enjoy greater flexibility in business activities. The categorization of mosques by the Selangor Islamic

Religious Department results in varying levels of operational freedom, with state mosques facing more restrictions than community mosques.

## 5. DISCUSSION

In this section, the study finds that all respondents agree that mosques' roles have changed. Mosques are not only demonstrated for the worshipping acts, rather their roles have broadened in serving the community via programs and initiatives provided by the mosque management. The interviews indicate the perspective of every mosque about the roles they must play in the modern day. From their point of view, it is agreed mosques nowadays become a center of attention for the communities to refer. From being only a place of worship, mosques also provide financial assistance to the targeted eligible community. They also create opportunities for them to involve in entrepreneurship is one of the key objectives for the mosque. Through the entrepreneurship programs, mosques have indicated rooms for the community to start their businesses such as carwash services, dining services, or being supplier to the mosques' cooperative. Other than that, mosques also collaborate with other agencies such as banks, and professional trainers to provide financial assistance to the start-up entrepreneurs and entrepreneurship skills classes.

The second conclusion of the study is that mosques have been viewed as a center with a lot potential to develop society economic sustainability through microeconomic programs. The table below indicates how mosques in Selangor state develop their own strategies to encourage microeconomic programs, leading the society by opening opportunities for gaining entrepreneurship incomes.

Mosques can significantly boost local economic development by implementing several key strategies. By establishing cooperatives and promoting community entrepreneurship, mosques provide essential resources and support for small businesses. They can act as training centers to enhance entrepreneurs' skills, which contributes to business success. Collaborating with banks for digital advertising and financial assistance further aids local traders. Utilizing digital platforms to promote mosque activities increases community engagement and potential financial support. Dedicated economic bureaus within mosques streamline and focus economic activities, while offering space for vendors to generate rental income and support affordable business opportunities. Additionally, renting out mosque facilities for events creates additional revenue streams and fosters

local economic activity. Through these efforts, mosques serve as vital hubs for both spiritual and economic growth in their communities.

Mosques can significantly contribute to economic development in their communities through several strategic approaches. By initiating and supporting financial and funding programs for the local community, mosques can alleviate poverty and stimulate local economic activity. Leveraging social media platforms to connect individuals with job opportunities and vocational training further enhances local economic prospects by creating a more interconnected job market. Strengthening the economic bureau within the mosque ensures effective resource management and targeted economic planning, while adhering to Shariah principles in financial guidelines fosters transparency and ethical practices. Quick response to financial issues faced by community members, such as providing emergency funds or financial counselling, helps stabilize and uplift the community, enabling more effective participation in local economic development. Finally, operating according to principles of corporate governance, including transparency and accountability, enhances the mosque's financial management and fosters trust within the community. Collectively, these strategies enable mosques to play a pivotal role in driving economic growth and development.

In general mosques often grapple with several operational challenges, primarily centered around financial stability and effective management. A significant issue is the heavy reliance on public donations, which can lead to financial instability given the fluctuating donation levels. This challenge is compounded by the lack of expertise in managing entrepreneurial ventures at the mosque level, making it difficult to execute business ideas successfully. Additionally, confusion among the public about the use of mosque funds and the nature of charity can lead to mistrust and dissatisfaction, as congregants may expect tangible returns from their contributions. The absence of specific fatwas on trading activities further complicates this, leaving mosques without clear religious guidelines on permissible business practices. Frequent rotation of committee members every three years can disrupt continuity in leadership and project execution, while limited financial resources and shortages of trained personnel hinder program implementation and economic initiatives. Finally, being controlled by a state religious department can restrict the mosque's ability to generate income through business activities, posing a significant obstacle to financial self-sufficiency. Addressing these challenges requires strategic planning, increased transparency, and effective resource management to ensure the

mosque can continue to serve its community while adhering to its religious and operational principles.

## 6. CONCLUSION

In conclusion, mosques play a crucial role in generating employment opportunities and betterment for society through strengthening the economic framework. Different categories of mosques impact their communities in various ways. For instance, *kariah* mosques tend to be more innovative and adaptable, while royal and state mosques often attract greater interest. This creates opportunities for the public to increase their income through mosque-driven initiatives and allows mosques to generate revenue independently.

However, significant challenges remain, particularly in terms of the need for support from authorities due to legal restrictions imposed on royal and state mosques. A pressing need is to empower the economic aspects of mosques while maintaining effective governance. Evidence indicates that mosques have the potential to generate substantial monthly and annual revenues and provide opportunities for the public to engage in microeconomic activities supported by the mosques. Various micro-businesses forms, such as services, training and dining can be explored. The establishment of cooperatives and funding initiatives is also essential to involve the community in entrepreneurial activities and secure funding.

Currently, mosques lack a specific economic development plan tailored for the *Muslim* community. Implementing such a plan is a complex and demanding task, especially within a limited three-year period. The challenge of turnover among mosque committees results in shifts in policies and management practices. Furthermore, the risks associated with the economic investments present a concern. Should a mosque or its community invest in assets and incur losses, questions arise regarding who would bear the loss. In this regard, it is crucial for the authorities to design a comprehensive guideline to facilitate mosques in managing their social-economic activities, especially in terms of governing mosques' financial management.

## REFERENCES

- Abdul Rahman, M.N., S. Abdul Hamid, S. Ismail, M.S. Ishak. "Kefahaman Tentang Konsep Pengimarahkan Masjid Sebagai Institusi Islam: Pengamalan Terhadap Masjid Yang Terpilih Di Semenanjung Malaysia." *E-Proceedings of 6<sup>th</sup> International*

- Conference on Mosque, Zakat and Waqf Management*. Bangi, Selangor. 30<sup>th</sup> October 2019.
- Wahab, A.S. Arsyad, and R. Syahrani. "Implementation of Sharia Economy as a Model of Community Empowerment." *Indonesian Interdisciplinary Journal of Sharia Economics* 4, no. 1 (2021): 168-78.
- Kurnia, A., N. Fitriyani, R. Hudaya. "Mosque as a Place to Improve Human Development Index". *Proceedings of the International Conference on Mathematics and Islam* (2018): 175-79.
- Al-Bukhari, Muhammad ibn Ismail. *Sahih al-Bukhari*. Dar al-Salam, 2009.
- Che Omar, A.R., M.Y. Mohd Hussin, and F. Muhammad. "Mosque Economic Activities and Entrepreneurial Orientation: A Preliminary Study". *International Journal of Accounting, Finance and Business* 2, no. 6 (2017): 50-6.
- Clarke, V., and V. Braun. "Using Thematic Analysis in Counselling and Psychotherapy Research: A Critical Reflection." *Counselling and Psychotherapy Research* 18, no. 2 (2018): 107-110.
- Corbin, J., and A. Strauss. "Grounded Theory Research: Procedures, Canons, and Evaluate Criteria." *Qualitative Sociology* 13, No.1 (1990): 3-21.
- El Hussein, M., S. Hirst, V. Salyers, O. Joseph. "Using Grounded Theories as a Method of Theory: Advantages and Disadvantages." *The Qualitative Report* 19, no. 27 (2014): 1-15.
- Guest, Greg., MacQueen, Kathleen M. and Namey, Emily E. "Introduction to Thematic Analysis." In *Applied Thematic Analysis*, edited by Greg Guest, Kathleen M MacQueen and Emily E Namey, 3-20. California: SAGE Publications, 2011.
- Hopf, C. "Qualitative Interviews: An Overview." *A Companion in Qualitative Research* 203, no. 8 (2004): 100093.
- Ismail, Z. "Manfaat Masjid, Teknologi Lonjak Produktiviti Ekonomi Islam." *Berita Harian*, 2022. [https://www.bharian.com.my/rencana/agama/2022/01/911362/manfaat-masjid-teknologi-lonjak-produktiviti-ekonomi-islam#google\\_vignette](https://www.bharian.com.my/rencana/agama/2022/01/911362/manfaat-masjid-teknologi-lonjak-produktiviti-ekonomi-islam#google_vignette)
- Jamsari, E.A., S.N. Tumiran, K.A. Bakar, and Z. Arifin. "Peranan dan Sumbangan Institusi Masjid dalam Pembangunan Masyarakat Melayu-Islam di Singapura: Satu Kajian di Masjid Assyafaah, Sembawang." *Journal of Islamic and Arabic Education* 2, no. 2 (2010): 31-44.

- Koehrsen, J. "Muslims and Climate Change: How Islam, Muslim Organizations, and Religious Leaders Influence Climate Change Perceptions and Mitigation Activities." *Wires Climate Change* 12 (2021): 1-19.
- Longhurst, R. "Semi-Structured Interviews and Focus Groups." In *Key Methods in Geography*, Edited by Nicholas Clifford, Meghan Cope and Thomas Gillespe. California: SAGE Publication (2023): 168-83.
- Prasad, B. Devi. "Content Analysis: A Method in Social Science Research." In *Research Method for Social Work* edited by D. K. Lal Das and Vanila Bhaskaran, New Delhi Rawat Publications (2008): 69-90.
- Raga Utama, R.D., Z. Fitrandasari, M. Ariffin, and R. Muhtadi. "Can Mosque Fund Management for Community Economic Empowerment? An Explanatory Study." *International Journal of Islamic Business Ethics* 3, no. 2 (2018): 451-57.
- Ritonga, A.H., and M.R. Wijaya. "Mosques and Economic Empowerment of The Ummah." *Jurnal At-Taghyir: Jurnal Dakwah Dan Pengembangan Masyarakat Desa* 4, no. 2 (2022): 317-32.
- Safei, A.A., and P.S. Armstrong. "Mosque Management in Urban City: Bargaining between the Sacred and the Social Challenges." *Wawasan: Scientific Journal of Religion and Socio-Culture* 8, no. 1 (2023): 43-54.
- Sulaiman, K.U. "An Islamic Perspective on the Protection of the Mind and Attainment of Happiness." *Proceeding-3<sup>rd</sup> Kuala Lumpur International Islamic Studies and Civilisations*. 25 & 26 Feb 2017.



## **HARNESSING INNOVATION FOR BUSINESS COMPETITIVENESS IN ACHIEVING SUSTAINABLE DEVELOPMENT GOALS**

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### **ABSTRACT**

This study examines the impact of technological, social, and environmental innovations on the competitiveness of Malaysian SMEs, focusing on how firm characteristics such as age, size, and type of activity moderate these effects. Data from 480 SMEs were analyzed using Partial Least Squares Structural Equation Modeling. The findings reveal that technological innovation positively impacts competitiveness, particularly when influenced by a firm's age, size, and activity type. Social innovation also has a direct positive effect on competitiveness, highlighting its importance in addressing social problems to boost business performance. Environmental innovation, however, showed an insignificant effect on competitiveness. The study emphasizes the need for integrating business innovations with supportive infrastructure and fostering a culture of social and environmental innovation to enhance competitiveness. It provides valuable insights for strengthening SMEs and encourages a more holistic approach to innovation for long-term competitive advantage.

JEL Classification: O120, O320, O440, P310

Keywords: Technological Innovation (TI), Social Innovation (SI), Environmental Innovation (EI), SMEs competitiveness, Open Innovation Theory

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## 1. INTRODUCTION

The competitive advantage of small and medium enterprises (SMEs) has been recognized as a fundamental step necessary for potential business growth (Falahat et al., 2020). Since the SME consolidation process, SME growth in Malaysia has increased by more than 10%, thus attracting global investors with strong technological innovation capabilities (Department of Statistics Malaysia, 2018). Given the 2017 SME development, 97.3% of business establishments were small and medium enterprises, thus directly contributing about 37% to the Gross Domestic Product (GDP). This statistic also represents 66% of employment, with a significant improvement in the standard of living (Jaafar, 2018). Since the GDP performance depends on exports, the government encourages local SMEs to export. Business competition, however, requires a business competitive advantage that can initiate innovations (Falahat, Knight, and Alon, 2018). Over the years, innovation capabilities in the business environment have been elevated, improving people's lives (Wang et al., 2019). Subsequently, with the help of innovation, more social and technical problems are resolved to improve living standards.

In Malaysia, a huge gap exists between technological, social, and environmental innovations. Technological innovation is significantly improving with advanced solutions (Falahat et al., 2020; Low, 2018). Nonetheless, the government's relentless effort to increase social and environmental innovation is ongoing (Islam and Wahab, 2021; Falahat et al., 2020). When it comes to social and environmental innovation, gaps still can be filled by SMEs (Wong et al., 2020). Therefore, good expansion of resources can overcome the huge gap in SME innovativeness (Islam and Wahab, 2021; Wong et al., 2020).

Most of the SME performance literature has investigated the innovation variables and their impact on growth. Consequentially, literature (Soni et al., 2019; Masocha, 2018) on SME innovation competitiveness only focuses on investigating the impact of technological innovation. On the contrary, only a few studies have highlighted the influence of firm type on innovation and competitiveness (Schaefer et al., 2020). Therefore, this paper examines the impact of innovations on SME competitiveness, thus focusing on technological innovation and the inclusion of social and environmental innovation. In addition, this paper will explore the

moderating role of variables (firm's age, size, and activity types) between innovations in enhancing SME competitive advantage.

## 2. LITERATURE REVIEW

### 2.1 THEORETICAL BACKGROUND

This study employed Open Innovation Theory (OI) as the underlying element of our conceptual framework. Hence, both internal and external ideas involve strategies to create outstanding business models. OI further assumes that to be innovative, a firm should possess the resources needed (Gassmann, Enkel, and Chesbrough, 2010; Chesbrough Vanhaverbeke, and West, 2006). Research and development (R&D) is considered a 'Progressive Innovation' whereby a company's innovativeness arises from both internal and external resources thus further building competitiveness. According to the OI concept, businesses should not rely solely on internal R&D efforts to spur innovation; instead, they should make use of outside sources (Gassmann et al., 2010). The function of OI in promoting environmental and social sustainability as well as the difficulties of fusing OI with technological innovation have been the subject of recent discussions (Chesbrough et al., 2014).

According to Basile, Tani, and Troise (2021), OI can be a potent tool for encouraging social and environmental sustainability. To ensure that businesses can keep innovating and remain competitive, others have emphasized the significance of integrating OI with technological innovation (Adro and Fernandes, 2022). We, therefore, look to integrate the OI with social, environmental, and technological innovation. Jenson (2015) defines social innovation as the creation that addresses societal issues. As consumers become more aware, social innovation is becoming increasingly important (Table 1). Businesses are under increasing pressure to create sustainable practices and products. Other studies (Ferreira, Fernandes, and Ferreira, 2020; Lee et al., 2019) emphasized that technological innovation ensures key strategies, systems, and processes in technology applications. Studies (Hamzah et al., 2022; Islam and Wahab, 2021) have suggested that a company's ability to innovate remains competitive.

Literature on OI and technological innovation concentrates on the technologies and industries. The transformation in the business model to fully embrace the integration of technological innovation has

yet to have an impact in Malaysia (Islam and Wahab, 2021). The integration of OI with social, environmental, and technological innovation is the subject of literature, but there are relatively few empirical studies, particularly in a developing country (Hamzah et al., 2021; Omar, Ishak, and Jusoh, 2020). Understanding how OI is implemented and how it impacts social, environmental, and technological innovation is difficult (Basile et al., 2021; Chesbrough et al., 2006).

TABLE 1  
Construct Definition and Description

Variables	Authors	Definition
Innovation	Gault (2018)	Refers to implementing a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practice.
Technological Innovation	Archibugi and Iammarino (2002)	Refers to a new, improved product or process whose technological characteristics differ significantly from before. New inventions are derived from research developments, technical knowledge, and tools independent of product and service initiatives.
Social Innovation	Jenson (2015)	Social innovations are new solutions (products, services, models, markets, processes, etc.) that meet a social need (more effectively than existing solutions) and lead to new or improved capabilities and relationships and better use of assets and resources.
Environmental Innovation	Kemp and Pearson (2007)	Refers to new products and processes that provide customer and business value but significantly decrease environmental impact.
SMEs Competitiveness	Poufinas, Galanos, and Papadimitriou (2018)	

Source: Authors' Conception

Consequently, based on the reflection of the theory on business innovation and firm competitiveness, studies (Chesbrough et al., 2014; Gassmann et al., 2010) have pointed out the significance of incorporating variables including environmental innovation, social innovation, technological innovation, firm's characteristics, and SME competitiveness. Therefore, this study aims at investigating the impact of Environmental Innovation, Social Innovation, and Technological Innovation on SME competitiveness, the effect of a firm's characteristics (age, size, and type of activity) on SME competitiveness, and the moderating role of firm's characteristics (age, size, and type of activity) on the relationship between innovations and SME competitiveness.

## 2.2 HYPOTHESIS DEVELOPMENT

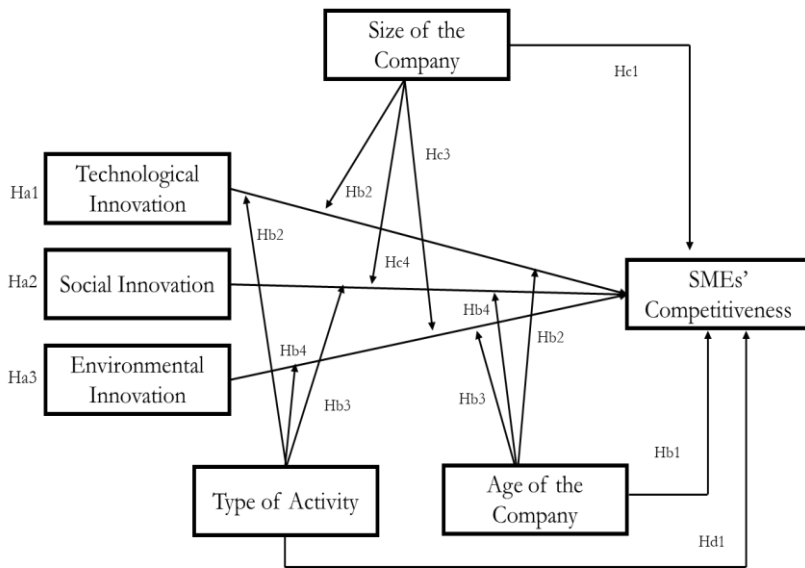
Since the Industrial Revolution necessitated technology integration to accelerate business operations, SMEs today are more likely to maximize production and compete effectively because of technological advancement (Radicic and Djalilov, 2019). Meanwhile, Bernardini Papalia, Bertarelli, and Mancinelli. (2018) stressed that successful SMEs are categorized as those that introduce not only technological innovation but also social innovations. According to Carfora, Scandurra, and Thomas (2021), social innovation revolves around improving social problems. Social innovation initiatives could improve people's lives (see Table 1). For instance, employees with sufficient training enhance their performance. SMEs with good social innovation are more likely to improve business performance. Few studies (Bodlaj and Čater, 2019; Uzkurt et al., 2018) have highlighted how SMEs innovate measures to impact positive environmental changes. Not many businesses are environmentally friendly (Bodlaj and Čater, 2019). Therefore, we hypothesize the following:

Ha1: Technological Innovation predicts a positive effect on SMEs' competitiveness.

Ha2: Social Innovation predicts a positive effect on SMEs' competitiveness.

Ha3: Environmental Innovation predicts a positive effect on SMEs' competitiveness.

FIGURE 1  
The Conceptual Framework



Source: Authors' Conception

Uzkurt et al. (2018) stipulated that technological innovation is sustained by older firms' ability. Therefore, the evolution of innovation is predetermined by the company's age (Islam and Wahab, 2021). Old companies have a relatively robust innovation structure. Di Vaio et al. (2020) argued that without consistency in innovation (which occurs over time), the dimension of business operation enhancement would be low. A study by Bodlaj and Čater (2019) revealed that firms with an average age of 25 years relatively develop a core standard business operation over time. Lee et al. (2019), however, argued that in some cases, new firms inculcate a culture of innovation in competitiveness. The firms that can achieve such initiative directly reflect their resource capability. Hence, we hypothesize the following:

Hb1: Firm's age predicts the positive impact on SMEs' competitiveness.

Hb2: Firm's age moderates the positive relationship between Technological Innovation and SMEs competitiveness.

Hb3: Firm's age moderates the positive relationship between environmental innovation and SMEs competitiveness.

Hb4: Firm's age moderates the positive relationship between social innovation and SMEs competitiveness.

According to Bodlaj and Čater (2019), larger companies can survive stronger competition compared to small companies. Firms' innovativeness could be influenced significantly by direct exposure to technology and social and environmental impact (Laforet, 2013). Laforet (2013) revealed that SMEs normally compete largely in the domestic market due to the size of their businesses. Bodlaj and Čater (2019) argued that SMEs with higher exports are mainly oriented to B2B markets. Other studies (Olander, Hurmelinna-Laukkanen, and Mähönen, 2018; Laforet, 2013) reveal that business operations are significantly influenced by the size and type of activity. Therefore, we hypothesize the following;

Hc1: The firm's size positively impacts SMEs' competitiveness.

Hc2: The size of the firm moderates the positive relationship between Technological Innovation and SME competitiveness.

Hc3: The size of the firm moderates the positive relationship between environmental innovation and SME competitiveness.

Hc4: The size of the firm moderates the positive relationship between social innovation and SME competitiveness.

Further research has implicated that one of the key drivers of a firm's innovativeness is the type of activity. For SMEs, operation capacity usually involves low-level production activities (Bodlaj and Čater, 2019). For example, Laforet (2013) highlighted that manufacturing requires large resources to be innovative. Arguably, in the manufacturing sector, some medium companies possess sufficient resources to innovate strategies for a highly competitive advantage. Olander et al. (2018) also emphasized that some firm activities significantly depend on a large group of workers to achieve effectiveness and efficiency. Therefore, we hypothesize the following;

- Hd1: Type of activity predicts a positive impact on SMEs' competitiveness.
- Hd2: Type of activity moderates the positive relationship between Technological Innovation and SME competitiveness.
- Hd3: Type of activity moderates the positive relationship between environmental innovation and SME competitiveness.
- Hd4: Type of activity moderates the positive relationship between social Innovation SME competitiveness.

Consequently, based on the above literature dimensions, a research model is developed to study the impact of environmental innovation, social innovation, and technological innovation on SME competitiveness and the moderating effect of a firm's age, size, and type of activity on the relationship between the types of Innovation and SMEs competitive advantage (as shown in Figure 1).

### 3. METHODOLOGY

#### 3.1 DEFINING THE POPULATION AND SAMPLE SIZE

The study focused on the SME population in Malaysia, which totals 1,173,601 as reported by SME Corporation Malaysia (2023). A sample of 480 participants (which includes business owners, entrepreneurs, CEOs, managers, and directors) from major Malaysian states such as Kuala Lumpur, Penang, Johor, and Selangor was selected. Defining a target population and determining a representative sample size are crucial for ensuring that the findings can be generalized to the entire population. The sample size was determined using the Krejcie and Morgan (1970) formula, which helps in calculating a statistically significant sample size from a given population.

#### 3.2 SAMPLING TECHNIQUE AND DATA COLLECTION

Purposive sampling was used to select participants who are experts and experienced in managing SMEs. Data was collected using a

structured questionnaire between January and March 2021. Out of 500 distributed questionnaires, 480 completed ones were received, representing an 80% response rate. Purposive sampling allows for the selection of participants who are best suited to provide relevant information, enhancing the quality of the data collected. A high response rate improves the reliability and validity of the data. Using experts as the respondents ensures that the data accurately reflects the experiences and perspectives of those directly involved in SMEs.

### 3.3 QUESTIONNAIRE DESIGN AND MEASUREMENT SCALE

The questionnaire covered demographic information of the respondents, innovation measurement, and competitiveness, using a 5-point Likert scale (ranging from strongly disagree to strongly agree). This scale is widely used in a similar study by Arsawan et al. (2022) for measuring attitudes and perceptions. The application of a Likert scale provides a standardized way to measure respondents' feedback, facilitating quantifying and analysis of subjective data. It allows respondents to express the degree of their agreement or disagreement, enabling collection of nuanced data. To ensure the validity of the instrument, "Context and Face validity" was used to examine and evaluate the questions under each variable.

### 3.4 DATA ANALYSIS USING SMARTPLS SOFTWARE

The collected data were analyzed using SmartPLS 4.0 software based on Partial Least Squares Structural Equation Modeling (PLS-SEM), a variance-based method. The analysis included two stages: (1) the measurement model and (2) the structural model, which involved bootstrapping analysis to evaluate correlation effects, r-square, f-square, and q-square (Hair et al., 2019; Kock, 2015). PLS-SEM is well-suited for complex models and is widely used in social science research because of its ability to handle multiple relationships simultaneously. It is particularly useful for exploratory research and theory development, where predictive accuracy and the analysis of complex models are needed.

### 3.5 ADDRESSING COMMON METHOD BIAS (CMB)

To minimize CMB, different rating scales were applied, reverse-scored items were incorporated, and several methods such as collinearity testing (VIF values), and convergent and discriminant validity checks, were applied. Addressing CMB is essential to ensure unbiased results from the data collection method. Techniques such as varying response scales and reverse scoring help reduce response biases. Statistical methods such as VIF confirm that the findings are not significantly influenced by CMB, enhancing result validity and relevance (Kock, Berbekova, and Assaf, 2021; Chuang, 2020).

### 3.6 MULTICOLLINEARITY AND VARIANCE ANALYSIS

The study conducted a multicollinearity test ( $VIF < 3$ ) and examined both exploratory and confirmatory factor analysis to ensure that variance explained by a single factor was less than 30%, which is below the 50% threshold. Testing for multicollinearity and variance is necessary to ascertain the independence of model variables. High multicollinearity can distort the results, while variance analysis confirms that no single factor dominates the models, ensuring a balanced and accurate representation of relationships.

## 4. DATA ANALYSIS

The data analysis reveals key demographic and structural characteristics of the surveyed Malaysian companies and respondents. Approximately 57.71% of participants are aged 46 and above, indicating a predominance of middle-aged to older respondents. Educational qualifications show that 51.67% hold a diploma or equivalent, while 48.33% possess master's or PhD/DBA degrees, reflecting a well-educated sample. The firms were relatively young, with 42.29% being one to 10 years old, 33.33% have been operating for 10-20 years, and 24.38% are well-established with over 20 years of experience.

Wholesale dominated in terms of business activities, representing 49.38% of firms, followed by "Service" at 23.33%, "Manufacturing" at 17.29%, and "Retail" at 6.46%. The majority of firms (51.46%) are classified as large, employing 200 or more people,

while medium-sized firms (100-199 employees) account for 38.75%. Small (10-99 employees) and micro firms (1-10 employees) represent 6.25% and 3.54%, respectively. Legal status analysis shows that nearly half (48.54%) of the firms operate as partnerships, followed by close corporations (26.46%), sole proprietors (14.58%), and others such as public corporations and franchises (10.42%). This comprehensive analysis provides critical insights into the composition and structure of surveyed firms.

#### 4.1 MEASUREMENT MODEL ANALYSIS

The data analysis reflects on both the measurement model and the structural model analysis. To ensure measurement model reliability and validity, an internal reliability assessment was conducted (including Cronbach's alpha and Composite reliability), convergent validity (CV), and discriminant validity (DV) on all constructs. Internal reliability was evaluated by examining Cronbach's alpha and Composite reliability, while the CV was evaluated by evaluating the average variance extracted, respectively (Ringle and Sarstedt, 2016; Hair et al., 2019). All item loadings for each construct are represented in Figure 2.

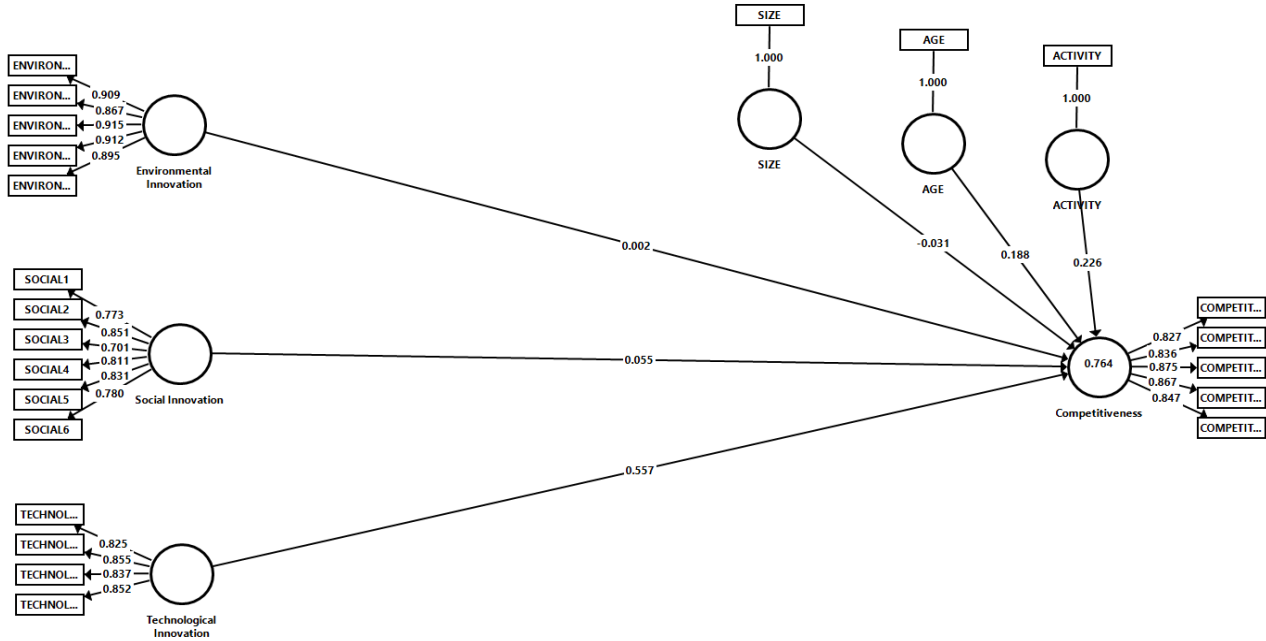
According to Table 2, all constructs' loadings range from 0.701 to 0.915, and this indicates that every item possesses a loading higher than the minimum threshold of 0.70 (Hair et al., 2019), despite a debatable analysis of a possible minimum threshold, which could also be 0.60 according to Hair et al. (2019). For instance, in construct (competitiveness), each item possesses loadings higher than 0.70, from 0.827 to 0.875, respectively. Meanwhile, for the bootstrapping analysis, Hair et al. (2019) suggest that for each item, loadings should be considered significant. The t-statistic must be  $\geq 1.96$  as the minimum threshold. For instance, in one construct (competitiveness), each item possesses loadings higher than 1.96, from 44,028 to 57,140, respectively. The loadings for each item have proven to be significant.

TABLE 2  
Construct Reliability and Validity

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)	f-Square	VIF Values	R Square	Q <sup>2</sup>
Activity	1.000	1.000	1.000	1.000	0.113	1.920		
Age	1.000	1.000	1.000	1.000	0.080	1.863		
Competitiveness	0.904	0.904	0.929	0.723	0.200	1.430	0.764	0.546
Environmental Innovation	0.941	0.942	0.955	0.810	0.035	1.994		
Size	1.000	1.000	1.000	1.000	0.162	2.253		
Social Innovation	0.881	0.885	0.910	0.628	0.590	2.228		
Technological Innovation	0.864	0.864	0.907	0.710	0.113	1.920		

Source: Based on PLS-SEM Analysis

FIGURE 2  
Measurement Model



Source: Based on PLS-SEM Analysis

The Cronbach's alpha analysis on factor loadings indicates a significant value  $> 0.70$ . The values range from 0.881 to 1.000, respectively. Moreover, all loadings for rho A and composite reliability indicated values  $> 0.70$ ; at least 70% of variance had been described by the construct's correlation (Ringle and Sarstedt, 2016). The average variance extracted (AVE) analysis shows that all the values achieved the minimum threshold of  $\geq 0.50$ , and all the loadings have values  $> 0.50$  (see Table 2). Consequently, all the variables possess significant Cronbach's Alpha, rho A, composite reliability, and average variance extracted, which means the reliability test is statistically significant for the model (Hair et al., 2019).

TABLE 3  
Discriminant Validity (HTMT)

	Original Sample (O)
Age -> Activity	0.570
Competitiveness -> Activity	0.737
Competitiveness -> AGE	0.700
Environmental Innovation -> Activity	0.428
Environmental Innovation -> Age	0.433
Environmental Innovation -> Competitiveness	0.488
Size -> Activity	0.436
Size -> Age	0.473
Size -> Competitiveness	0.468
Size -> Environmental Innovation	0.343
Social Innovation -> Activity	0.498
Social Innovation -> Age	0.470
Social Innovation -> Competitiveness	0.601
Social Innovation -> Environmental Innovation	0.757
Social Innovation -> Size	0.372
Technological innovation -> Activity	0.683
Technological Innovation -> Age	0.651
Technological Innovation -> Competitiveness	0.739
Technological Innovation -> Environmental Innovation	0.493
Technological Innovation -> Size	0.520
Technological Innovation -> Social Innovation	0.625

Source: Based on PLS-SEM Analysis

Table 3 shows that all HTMT values for the constructs are significant since all the loadings are  $< 0.850$ . Hence, with the confidence interval, none of the values includes a value of 1. All constructs show discriminant validity using the HTMT method (Ringle and Sarstedt, 2016). According to Kock (2015), VIFs must be examined to detect any possible multicollinearity issues and CMB, and all values must not be  $> 5.0$ . Hence, Table 3 shows that the model is free from any possible multicollinearity because all the loadings for the constructs are  $< 3.0$  (as in Table 2).

## 4.2 STRUCTURAL MODEL ANALYSIS

The report from Table 2 indicates that R-square and Adjusted R-square were 0.764 and 0.761, respectively. This represents a significant correlation between all constructs (including environmental Innovation, Social Innovation, Technological Innovation, firm age, firm size, and types of activity) and competitiveness. The correlation between all the variables is statistically significant, with a p-value less than 0.05. The predictive values for the f-square analysis are represented as a small predictive effect (0.02 but  $< 0.15$ ), medium effect (0.15 but  $< 0.35$ ), and significant effect ( $\geq 0.35$ ). On average, the f-square analysis (see Table 2) shows that environmental, social, and technological innovation reflects a medium predictive influence. Therefore, the value of the reflective constructs on competitiveness is statistically significant, displaying beta values between 0.010 and 0.590 (Hair et al., 2019). Table 2 shows the predictive relevance Q<sup>2</sup> of competitiveness, which shows a value of 0.546, proving that the model has considerable predictive relevance. This connotes that the model has Q<sup>2</sup> values higher than zero, which provides support for the significance of the model's predictive relevance for all the rest of the constructs (Ringle et al., 2019).

## 5. DISCUSSION

Table 4 shows a positive correlation between technological innovation and SME competitiveness ( $p=0.000$ ). This implies that technological innovation predicts a positive effect on SME competitiveness. The finding highlights several key perspectives. For society, it suggests economic growth, job creation, and improved living standards.

Environmentally, its impact depends on whether sustainable practices are prioritized (Di Vaio et al., 2020; Lee et al., 2019; Lee and Trimi, 2018). Governments should support technological advancement through favorable policies and incentives. Businesses are encouraged to invest in technology for enhanced productivity and market position. Academically, this finding invites research into effective innovation strategies and adoption barriers. For investors, technology-innovative SMEs represent promising investment opportunities because of their growth potential (Islam and Wahab, 2021).

Table 4 depicts that the correlation between constructs (age of a firm and its types of activity) and SME competitiveness is significant ( $p < 0.01$ ). The finding suggests that older, experienced firms in certain industries are better positioned for success, offering greater economic stability and job security. While established firms may be more capable of adopting sustainable practices, promoting eco-friendly initiatives across all business types is crucial. Government policies should support both young and mature firms, enhancing competitiveness and sustainability. For investors, these findings highlight the appeal of investing in well-established firms for stable returns (Di Vaio et al., 2020). That means the effect of constructs (age of a firm and its types of activity) on SME Competitiveness is positively significant. A study by Laforet (2013) revealed that older firms with strategic orientations and innovation patterns have a successful performance level to compete with other companies. A company's ability to expand its exploitative innovativeness does not necessarily depend on the age of the business.

Our analysis however found that the relationship between environmental innovation and SME Competitiveness is insignificant ( $p = 0.956$ ) (see Table 4). The findings suggest that entrepreneurs might prioritize technological or product innovations that offer direct competitive advantages, while consumers may not see immediate benefits in product quality or pricing from environmental practices. This suggests that environmentally friendly practices may not motivate firms purely based on competitiveness. Governments should emphasize other benefits, such as long-term sustainability and regulatory compliance, to encourage environmental innovation adoption. Businesses should incorporate environmental innovation into broader strategies for ethical practices risk management, and brand reputation. A similar finding from Radicic and Djalilov (2019) found that environmental innovation impact on SME business performance is insignificant. The growing environmental problem has

significantly urged companies to establish products capable of addressing environmental issues (Radacic and Djajilov, 2019; Bodlaj and Čater, 2019).

TABLE 4  
Path Coefficient

	Original Sample	T Statistics	P Values
ACTIVITY -> Competitiveness	0.226***	6.336	0.000
AGE -> Competitiveness	0.188***	5.348	0.000
Environmental Innovation -> Competitiveness	0.002	0.055	0.956
SIZE -> Competitiveness	-0.031	1.072	0.284
Social Innovation -> Competitiveness	0.055*	1.768	0.077
Technological Innovation -> Competitiveness	0.557***	16.609	0.000
AGE_ENV -> Competitiveness	-0.018	0.532	0.595
AGE_SOC -> Competitiveness	-0.029	0.636	0.525
AGE_TECH -> Competitiveness	0.250***	6.695	0.000
SIZE_ENV -> Competitiveness	0.003	0.065	0.948
SIZE_SOC -> Competitiveness	0.019	0.383	0.702
SIZE_TECH -> Competitiveness	0.122***	6.753	0.000
ACTIVITY_ENV -> Competitiveness	-0.064	1.475	0.140
ACTIVITY_SOC -> Competitiveness	0.005	0.096	0.924
ACTIVITY_TECH -> Competitiveness	0.146***	6.692	0.000

Note: Level of Significance: \*\*\*p<0.01, \*\*p<0.05, \*p<0.10

Source: Based on PLS-SEM Analysis

The results show that the firm’s age and size significantly moderate the relationship between technological innovation and SME competitiveness (p<0.01). This finding highlights the importance of tailoring innovation strategies based on a firm’s characteristics, according to Hamzah et al. (2021). Larger and older firms, with more resources, may adopt technological and sustainable practices more readily, affecting product quality and service delivery. Governments should create targeted policies and support for businesses of different sizes and ages to enhance their competitiveness. The analysis reveals that age and size positively influence the impact of technological

innovation on competitiveness. Relevant studies (Islam and Wahab, 2021; Hamzah et al., 2021; Wong et al., 2020) also noted that, despite SME contributions to Malaysia's GDP, technological advancements primarily occur in medium and large firms, with large corporations dominating the technological market. The findings indicate that the moderating effect of a firm's age and size on the relationship between environmental and social innovation and SME competitiveness is insignificant ( $p > 0.10$ ). This suggests that innovation strategies, rather than firm demographics, are key to enhancing competitiveness. All firms, regardless of size or age, can contribute equally to sustainability and product diversity. Hence Governments should provide equal innovation support across firms (Hanifah et al., 2019; Radicic and Djalilov, 2019).

In Malaysia, the impact of environmental and social innovation on SME competitiveness is still limited, partly due to over-reliance on imported Chinese technology. Developing local innovations in IT and mobile technology could improve SME performance. Prior research also suggests that firm size and age do not necessarily affect competitiveness (Saeidi et al., 2018).

The study found that the moderation effect of a firm's types of activity on the relationship between technological innovation and SME competitiveness is significant ( $p < 0.01$ ). The result highlights that firm activity type significantly affects how technological innovation impacts its competitiveness. This means entrepreneurs must consider how their firm's activities influence their ability to leverage technological advancements. Consumers may benefit from improved and diverse products. Environmentally, firms in tech-intensive sectors might better adopt green technologies, while others may face different challenges. Governments can use these insights to tailor policies and support programs, and businesses should align their innovation strategies with their industry-specific needs for optimal competitive advantage. The result revealed that a firm's types of activity positively influence the impact of technological innovation on competitiveness. Consequently, when the set of technology successfully aligns with the SME, the company will be highly capable of maximizing its innovativeness, eventually increasing its competitive advantage (Laforet, 2013). The findings reveal that the firm's type of activity has an insignificant moderating influence on the relationship between social and environmental innovation and SME competitiveness ( $p > 0.10$ ) (see Table 4). This suggests that societal and environmental benefits from such innovations are not fully realized,

highlighting the need for stronger policies, incentives, and awareness around sustainability. Hanifah Halim et al. (2019) emphasized that social and environmental innovations are critical in Malaysia, yet they remain limited because of insufficient technological support, especially for SMEs. Large companies receive the majority of support, while SMEs face challenges from a lack of innovative culture. As a result, innovations in social, environmental, and technological areas are often imported from foreign businesses, limiting local competitiveness (Le, 2022).

## 6. CONCLUSION

This study offers valuable insights into how technological, social, and environmental innovations impact the competitiveness of Malaysian SMEs. It finds a significant positive correlation between technological innovation and SME competitiveness, indicating that businesses leveraging technological advancements tend to perform better and maintain a stronger market presence. Medium to large firms benefit more from these innovations than smaller firms, with firm age and size significantly moderating this relationship. Conversely, the study reveals an insignificant relationship between environmental innovation and competitiveness, suggesting that while sustainability is recognized, its practical impact on SME competitiveness in Malaysia remains limited. The age and size of firms do not moderate the effects of social and environmental innovations, pointing to a potential area for policy interventions to enhance these aspects. This study also highlights the importance of aligning a firm's business activities with its innovation strategy, particularly for technology-intensive firms, which gain more competitive advantages. The limited impact of social and environmental innovations, however, suggests a need for stronger policies and cultural shifts to foster innovation within SMEs. This research emphasizes a holistic approach to innovation that integrates technological, social, and environmental dimensions, calling for policymakers and business leaders to promote innovation strategies that can enhance SME competitiveness in the global market.

### 6.1 CONTRIBUTION OF THE STUDY

This study provides a novel contribution by examining the impact of technological, social, and environmental innovations on the competitiveness of Malaysian SMEs, highlighting the importance of

sustainability-driven innovation in a developing economy. Unlike previous research that focuses primarily on technological innovation, this study broadens the scope to include multiple forms of innovation, revealing that social and environmental innovations have limited impact given the cultural and technological barriers. It also explores how firm characteristics such as age, size, and business activity moderate the effectiveness of these innovation strategies. The findings underscore the need for targeted support for SMEs to overcome these barriers and enhance sustainability efforts. The study validates existing innovation theories in the context of developing economies and offers localized insights, providing valuable information for policymakers and business leaders. It calls for future research that adopts a comprehensive approach to understanding the relationship between innovation and competitiveness in diverse economic contexts.

## 6.2 POLICY IMPLICATIONS

The study emphasizes the crucial role of technological innovation in enhancing SME competitiveness over social and environmental innovation. Cultivating a culture of creativity within firms is essential for entrepreneurs aiming to gain a competitive edge. While environmental innovation may not immediately impact competitiveness, it aligns with consumer expectations for sustainability and ethical business practices, fostering long-term customer loyalty and market relevance (Di Vaio et al., 2020). Despite its minimal immediate effect, environmental innovation remains vital for achieving sustainable success and complying with regulations such as the Paris Agreement. Implementing green practices helps businesses contribute to global climate goals and secure a sustainable competitive advantage.

Policymakers should support technological innovation while also promoting environmental sustainability by offering incentives such as subsidies for green infrastructure. These efforts can help SMEs adopt environmentally friendly practices, aligning with international targets such as the 2050 Net Zero goal. To foster sustainable economic growth, policies must integrate technological, social, and environmental innovation. Businesses should prioritize technological advancements to enhance competitiveness, while also incorporating environmental and social innovations into their strategies (Tu and Wu, 2021). Green innovation in supply chains can prompt broader

environmental strategies, helping companies meet regulatory standards and stakeholder expectations. This holistic approach allows firms to address societal challenges, remain competitive, and contribute to achieving the Sustainable Development Goals (SDGs), according to Le (2022).

## 7. LIMITATIONS AND RECOMMENDATIONS

This study has some consequential limitations to be discussed. First, we take into account the characteristics of a firm that influence business competitiveness (Laforet, 2013); our study includes the age, size, and type of activity of a firm, which eventually conforms to our findings that those characteristics do have a direct influence on firms' business competitiveness. Second, the COVID-19 restrictions hindered the structured procedure for carrying out face-to-face interviews. Therefore, all responses were acquired online. Because of these limitations of this study and the continuously evolving nature of the business structure, this study recommends further investigation of the direct relationship between innovations and SME competitiveness and the moderation effect of age, size, and types of activity on innovation. Future researchers may consider extending the investigation on the moderation influence of SMEs' resources and reputation on the relationship between innovation (technological, social, and environmental) and competitiveness. Researchers may also consider investigating the constructs to examine the possible impact of SME competitiveness and their characteristics on innovation.

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## REFERENCES

- Adro, F.D., and C. Fernandes. "Social Entrepreneurship and Social Innovation: Looking Inside the Box and Moving Out of it." *Innovation: The European Journal of Social Science Research* 35, no. 4 (2022): 704-30.
- Arsawan, I.W.E., V. Koval, I. Rajiani, N.W. Rustiarini, W.G. Supartha, and N.P.S. Suryantini. "Leveraging Knowledge

- Sharing and Innovation Culture into SMEs Sustainable Competitive Advantage.” *International Journal of Productivity and Performance Management* 71, no. 2 (2022): 405-28.
- Basile, G., M. Tani, and C. Troise. “Social Open Innovation: Using Stakeholder Engagement to Link Open Innovation with Social Needs.” In *14th Annual Conference of the EuroMed Academy of Business*. September 2021.
- Bernardini Papalia, R., S. Bertarelli, and S. Mancinelli. “Innovation, Complementarity, and Exporting. Evidence from German Manufacturing Firms.” *International Review of Applied Economics* 32, no. 1 (2018): 3-38.
- Bodlaj, M., and B. Čater. “The Impact of Environmental Turbulence on the Perceived Importance of Innovation and Innovativeness in SMEs.” *Journal of Small Business Management* 57, no. 2 (2019): 417-35.
- Carfora, A., G. Scandurra, and A. Thomas. “Determinants of Environmental Innovations Supporting Small-and Medium-Sized Enterprises Sustainable Development.” *Business Strategy and the Environment* 30 no. 5 (2021): 2621-636.
- Chesbrough, H., Vanhaverbeke, W., and West, J. (Eds.). *Open Innovation: Researching a New Paradigm*. Oxford University Press on Demand. 2006.
- \_\_\_\_\_, W. Vanhaverbeke, and J. West. (Eds.). *New Frontiers in Open Innovation*. Oxford: Oxford University Press, 2014.
- Chuang, Y. W. “Promoting Consumer Engagement in Online Gaming Communities through Virtual Experience and Social Identity.” *Sustainability* 12, no. 3 (2020): 855.
- Department of Statistics Malaysia. *The Performance of the State's Economy*, 2018.  
[https://www.dosm.gov.my/v1/index.php?r=column/cthemeByCat&cat=449&bul\\_id=L25EUXQxbWdBaEVoWXU5aTFQWUpNdz09&menu\\_id=TE5CRUZCb1h4ZTZMODZlbnk2aWRRRQT09](https://www.dosm.gov.my/v1/index.php?r=column/cthemeByCat&cat=449&bul_id=L25EUXQxbWdBaEVoWXU5aTFQWUpNdz09&menu_id=TE5CRUZCb1h4ZTZMODZlbnk2aWRRRQT09)
- Di Vaio, A., R. Palladino, R. Hassan, and O. Escobar. “Artificial Intelligence and Business Models in the Sustainable Development Goals Perspective: A Systematic Literature Review.” *Journal of Business Research* 121 (2020): 283-314.
- Falahat, M., G. Knight, and I. Alon. “Orientations and Capabilities of Born Global Firms from Emerging Markets.” *Int. Market. Rev.* 35 no. 6 (2018): 936–57.

- \_\_\_\_\_, T. Ramayah, P. Soto-Acosta, and Y.Y. Lee. "SMEs Internationalization: The Role of Product Innovation, Market Intelligence, Pricing, and Marketing Communication Capabilities as Drivers of SMEs' International Performance." *Technological Forecasting and Social Change* 152 (2020): 119908.
- Ferreira, J.J., C.I. Fernandes, and F.A. Ferreira. "Wearing Failure as a Path to Innovation." *Journal of Business Research* 120 (2020): 195-202.
- Gassmann, O., E. Enkel, and H. Chesbrough. "The Future of Open Innovation." *R&D Management* 40, no. 3 (2010): 213-21.
- Hair, J.F., C.M. Ringle, S.P. Gudergan, A. Fischer, C. Nitzl, and C. Menictas. "Partial Least Squares Structural Equation Modelling-Based Discrete Choice Modelling: An Illustration in Modelling Retailer Choice." *Business Research* 12, no. 1 (2019): 115-42.
- Hamzah, M.I., N.S. Tanwir, S.N. Wahab, and M.H. Abd Rashid. "Consumer Perceptions of Hybrid Electric Vehicle Adoption and the Green Automotive Market: The Malaysian Evidence." *Environment, Development, and Sustainability* 24 no. 2 (2022): 1827-851.
- Hanifah, H., H. Abdul Halim, N.H. Ahmad, and A. Vafaei-Zadeh. "Emanating the Key Factors of Innovation Performance: Leveraging on the Innovation Culture among SMEs in Malaysia." *Journal of Asia Business Studies* 13, no. 4 (2019): 559-87.
- Islam, A. and S.A. Wahab. "The Intervention of Strategic Innovation Practices in between Regulations and Sustainable Business Growth: A Holistic Perspective for Malaysian SMEs." *World Journal of Entrepreneurship, Management and Sustainable Development* 17, no. 3 (2021): 396-421.
- Jaafar, S.S. SME contribution to Malaysia's economy rose to 37% in 2017, 2018. *The Edge Market*. <https://theedgemaalaysia.com/article/sme-contribution-malysias-economy-rose-37-2017>
- Jenson, J. "Social Innovation: Redesigning the Welfare Diamond." In *New Frontiers in Social Innovation Research* (89-106). London: Palgrave Macmillan, 2015.
- Kock, F., A. Berbekova, and A.G. Assaf. "Understanding and Managing the Threat of Common Method Bias: Detection,

- Prevention and Control.” *Tourism Management* 86 (2021): 104330.
- Kock, N. “Common Method Bias in PLS-SEM: A Full Collinearity Assessment Approach.” *International Journal of e-Collaboration* 11, no. 4 (2015): 1-10.
- Laforet, S. “Organizational Innovation Outcomes in SMEs: Effects of Age, Size, and Sector.” *Journal of World Business* 48, no. 4 (2013): 490-502.
- Lee, J., T. Suh, D. Roy, and M. Baucus. “Emerging Technology and Business Model Innovation: The Case of Artificial Intelligence.” *Journal of Open Innovation: Technology, Market, and Complexity* 5, no. 3 (2019): 44.
- Lee, S.M., and S. Trimi. “Innovation for Creating a Smart Future.” *Journal of Innovation & Knowledge* 3, no. 1 (2018): 1-8.
- Le, T.T. “How do Corporate Social Responsibility and Green Innovation Transform Corporate Green Strategy into Sustainable Firm Performance?” *Journal of Cleaner Production* 362 (2022): 132228.
- Low, C. *SME CEO Forum 2018 – How the Digital Economy will Disrupt Businesses in Malaysia*, 2018. <https://comms.kaodim.Com/2018/10/25/sme-CEO-forum-2018-digitising-SMEs-across-Southeast-Asia/>.
- Masocha, R. “Does Environmental Sustainability Impact Innovation, Ecological and Social Measures of Firm Performance of SMEs? Evidence from South Africa.” *Sustainability* 10, no. 11 (2018): 3855.
- Olander, H., P. Hurmelinna-Laukkanen, and J. Mähönen. “What's Small Size Got to Do with it? Protection of Intellectual Assets in SMEs.” In *Exploiting Intellectual Property to Promote Innovation and Create Value* (2018): 171-93.
- Omar, A.R.C., S. Ishak, and M.A. Jusoh. “The Impact of Covid-19 Movement Control Order on SMEs' Businesses and Survival Strategies.” *Geografia-Malaysian Journal of Society and Space* 16, no. 2 (2020): 139-50.
- Radicic, D. and K. Djalilov. “The Impact of Technological and Non-Technological Innovations on Export Intensity in SMEs.” *Journal of Small Business and Enterprise Development* 26, no. 4 (2019): 612-38.
- Ringle, C.M., and M. Sarstedt. “Gain more Insight from your PLS-SEM Results: The Importance-Performance Map Analysis.”

- Industrial Management & Data Systems* 116, no. 9 (2016): 1865-886.
- Saeidi, S.P., M.S.H. Othman, P. Saeidi, and S.P. Saeidi. "The Moderating Role of Environmental Management Accounting Between Environmental Innovation and Firm Financial Performance." *International Journal of Business Performance Management* 19, no. 3 (2018): 326-48.
- Schaefer, J.L., I.C. Baierle, M.A. Sellitto, J.C.M. Siluk, J.C. Furtado, and E.O.B. Nara. "Competitiveness Scale as a Basis for Brazilian Small and Medium-Sized Enterprises." *Engineering Management Journal* 33, no. 1 (2020):1-17.
- SME Corporation Malaysia. *Profile & Performance of MSMEs in 2022*. <https://smecorp.gov.my/index.php/en/policies/2020-02-11-08-01-24/sme-statistics>
- Soni, N., E.K. Sharma, N. Singh, and A. Kapoor. "Impact of Artificial Intelligence on Businesses: From Research, Innovation, Market Deployment to Future Shifts in Business Models." <https://arxiv.org/abs/1905.02092>
- Tu, Y., and W. Wu. "How Does Green Innovation Improve Enterprises' Competitive Advantage? The Role of Organizational Learning." *Sustainable Production and Consumption* 26 (2021): 504–16.
- Uzkurt, C., R. Kumar, H.S. Kimzan, and H. Sert. "The Impact of Environmental Uncertainty Dimensions on Organizational Innovativeness: An Empirical Study on SMEs." *Promoting Innovation in New Ventures and Small-and Medium-Sized Enterprises* (2018): 151-75.
- Wang, Y., M. Singgih, J. Wang, and M. Rit. "Making Sense of Blockchain Technology: How Will it Transform Supply Chains?" *International Journal of Production Economics* 211 (2019): 221-36.
- Wong, L.W., L.Y. Leong, J.J. Hew, G.W.H. Tan, and K.B. Ooi. "Time to Seize the Digital Evolution: Adoption of Blockchain in Operations and Supply Chain Management among Malaysian SMEs." *International Journal of Information Management* 52 (2020): 101997.





## **DIMINISHING PARTNERSHIP AS SOLUTION TO TURKEY'S HOUSING CRISIS: AN ANALYSIS FROM ISLAMIC LAW PERSPECTIVE**

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### **ABSTRACT**

The concept of decreasing *mushārahah* or *al-Mushārahakhtu'l-mutanāqīshah* involves a capital operation within a partnership, culminating in the transfer of ownership. Unlike traditional practices, this partnership model emerged in the 20th century and has since become a specialized arrangement in contemporary financial practices, notably within interest-free financial institutions or participation banks. In diminishing *mushārahah*, the financial institution gradually reduces its share in the partnership until it is wholly transferred to the customer, who then assumes the role of managing partner. This arrangement aims at providing interest-free financing while generating profits for all involved parties, offering diverse banking services beyond permanent *mushārahah* setups. It entails multiple individuals joining forces in an income-generating venture, with one party progressively acquiring the shares of others until they gain sole ownership through successive independent sales contracts. Diminishing *mushārahah* is an alternative to conventional methods, particularly within interest-free financial institutions across industry, trade, agriculture, and tourism. This research investigates integrating diminishing partnership systems into Turkish housing finance, primarily through *Ijārah*-based diminishing *mushārahah* financing methods, post the pandemic-induced housing crisis. The study identifies infrastructure, staff training, and product competitiveness as areas needing improvement in the participation banking sector, suggesting legal adjustments and regulatory frameworks for effective implementation. This research emphasizes the necessity of comprehensive legislative changes within Turkey's financial framework to accommodate diminishing partnership systems. It offers original insights and proposes legal amendments that uniquely contribute to participatory banking research. It presents a fresh perspective on home financing, promoting economic autonomy and housing market accessibility through innovative approaches.

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## 1. INTRODUCTION

*Mushārakah* or partnership in *Islāmic* corporate law refers to a capital partnership with varying capital ratios and profit shares (Ābidīn, 1984). Originating from an ancient company structure, it encourages collaboration for profit sharing. Interest-free banking has led to the evolution of financing methods, such as Diminishing Partnership or *al-Mushārakah al-Mutanāqīṣah* (Bayındır, 2005). This approach gradually concludes the partnership, transferring ownership over time. Originating from Sami Hammud's 1976 doctoral study, it gained traction during the First Islamic Banking Symposium in 1979 (Ḥammūd, 1982). This study highlights the diminishing partnership as an alternative partnership financing model, highlighting *Sharī'ah* regulations prohibiting both parties from taking a lump sum of profit beyond their equity shares. It also emphasizes the importance of sharing appreciation of home value over time (AAOIFI Shari'ah Standards, 2010).

Turkey, struggling with a severe economic crisis from COVID-19 and historic earthquakes affecting 11 significant cities, faces housing challenges, especially for low-income groups. Global recessions intensified following the COVID-19 pandemic and the Russia-Ukraine war, with subsequent contractions post-February six earthquakes. The OECD lowered Turkey's 2023 growth forecast from 3.0% to 2.8% in March 2023 (Sabırsız and Şöhret, 2024). The crisis has led to job losses, falling household incomes, and difficulty paying for essentials such as food, shelter, and healthcare. Despite public and private sector efforts, the housing sector remains inadequate regarding demand and affordability (TOKİ, 2020) despite reports that the state plans to build or renovate 13 million housing units annually, with an annual target of 1 million. The government implemented measures such as reducing interest rates, introducing land registry applications, and imposing work allowances to address surplus supply and economic challenges (Tanrıvermiş, 2020). Because of the economic reformation, during the March 2024 Money Market Board meeting, the Central Bank of the Republic of Turkey raised the policy rate of interest with a 500-Point Interest Rate Increase to 50% (Erkoyun and

Butler, 2024); this escalation marked the policy rate's highest nominal level since March 2003. This caused a 14.9% decrease in housing sales from January to November 2023, according to TUIK report (Kaya and Gönültaş, 2023). Homeownership has been an elusive dream for many, with average monthly rents in smaller towns and cities around \$600 (Uras, 2023).

Turkey's housing crisis calls for alternative financing aligned with economic realities and *Islāmic* principles. Hussen (2022) highlights the role of government incentives in firm performance, while Erdem and Tatli (2024) explore *Islāmic* finance's potential, particularly in diminishing partnerships beyond SMEs. Paylan and Kavas (2021) show that economic uncertainty affects consumer behavior. These studies support diminishing partnerships as a *Sharī'ah*-compliant, sustainable housing solution that eases financial burdens and promotes economic stability.

The study proposes a 'diminishing partnership' model for Turkish Participation Banks, which is already in use in countries such as Bangladesh and Pakistan. This *Islāmic* banking model, which strictly adheres to regulations prohibiting interest-based transactions and *gharar* (uncertainty), offers an ethical solution to the housing crisis. Mortgages, often associated with *gharar* and gambling, are considered unethical. The Diminishing Partnership from Turkey, however, provides many advantages, including interest-free funding, progressive property ownership, affordable homes, secure property markets, responsible lending while preventing extended financial strain, flexible payment options, and economic development. DP's *Sharī'ah*-compliant and ethical nature offers certainty and removes any risk associated with speculation from the financing process. The program distributes home ownership responsibilities and risks across a period to ease home ownership costs. Participation banks establish affordable home ownership options through their housing offerings, which reach out to low and medium-income families to buy homes. The responsible lending approach under DP counters reckless lending while cutting down long-term debt problems. The implementation of DP in Turkey encounters multiple barriers consisting of regulatory restrictions and legal requirements, along with difficulties in awareness, elevated initial expenses, profit concerns, and market competition, along with delayed ownership transfer processes, complex operational procedures, administrative work, and property valuation uncertainties, and possible contractual misuse.

## 2. LITERATURE REVIEW

Rosly (2005) suggested that diminishing partnership (DP) could enhance stability by reducing market volatility and potentially minimizing financial crises. In their 2014 study, Amin, Rahim, and Razak (2014) investigated the determinants shaping Malaysia's demand for home financing. They underscored the significance of demographic variables such as marital status, ethnicity, and religious dedication in forecasting the future appeal of *Islāmic* home financing products, which were deemed *Sharī'ah*-compliant as early as 1979. However, *Islāmic* Banks rarely utilize it for various reasons despite its notable advantage of expediting ownership transfer compared to conventional mortgage methods (Kameel, Meera, and Razak, 2009).

Diminishing partnership (DP) contracts, which are compliant with *Sharī'ah* principles, have been widely accepted among *Muslim* scholars for their potential to promote responsible lending and financial stability. Studies (Smolo and Hassan, 2011; İbeçoğlu, 2023) have shown that these contracts can alleviate poverty through Microfinance and interest-free loans to small and medium-sized enterprises (SMEs). Operational challenges such as property taxes and rental rates, however, must be resolved for DP to be practical and user-friendly.

Within this model, cooperative housing organizations in Canada, the UK, and the USA have successfully offered interest-free financing for thousands of homes to the *Muslim* community (Selim, 2020; Loundy, 2013). Bebercuma (2006) suggests that the housing above finance system must be examined for its continued existence. Bendjilal and Khan (1995) highlight the potential of DP in alleviating poverty by reducing homelessness and enhancing stability by reducing market volatility.

According to Asadov et al. (2018), *Islāmic* financial institutions should split all contract expenses rather than just the Property Buyer's (PB) portion. By their suggested strategy, the house would be rented to a third party at the going rate, with the option for the PB to move in later, provided they agree to pay the current market rental rate, which would be split between the *Islāmic* Bank and the PB. This approach avoids uncertainty and adheres to *Sharī'ah* law by not using interest-based standards. Moghul (2017) strongly emphasized encouraging ethical investing, carrying out social obligations, and incorporating spirituality and the UN Principles of Responsible Investment into *Sharī'ah*-compliant home finance. Bayındır and İnanır (2005) have highlighted the importance of partnership

frameworks in *Islāmic* capital management, which emerged in the mid-20th century. Interest-free banking, which advocates for capital management within the partnership principle, has gained traction in Turkey. Dinc (2017) underlined Turkey's success in Murabaha financing for mortgage purposes, suggesting it could serve as a global model.

### 3. HOUSE DEMAND IN TURKEY THROUGH DP

The 2018 crisis, exacerbated by political tensions with the US (Çakmaklı et al., 2020; Coşkun, 2016; Gül, 2017) in Turkey, led to a severe economic downturn, resulting in a significant devaluation of the Turkish Lira against the US dollar and a surge in inflation. This led to numerous firms declaring bankruptcy and high unemployment rates (Akçay and Güngen, 2019; Uddin 2018). As the pandemic unfolded globally, governments enforced unprecedented measures, including lockdowns and business restrictions, altering societal dynamics and economic landscapes. The Turkish economy, housing markets, and households were severely impacted, with the lack of a recovery period and lockdowns shuttering small and medium-sized enterprises, including construction firms, amplifying economic downturns and unemployment (Sari, 2022).— The pandemic compounded pre-existing economic woes, particularly unemployment and the housing crisis. Even before the pandemic, Turkey had grappled with a high unemployment rate, which surged further after COVID-19 emerged (TÜİK, 2020).

In Turkey, purchasing a new home remains unattainable, mainly for low and middle-income individuals. Escalating house prices and loan expenses steadily deteriorate home ownership's feasibility, dimming prospects with each passing day. Rent prices have surged sixfold nationwide over the past four years, with metropolitan areas experiencing even steeper hikes. Data disclosed by Istanbul Metropolitan Municipality Deputy Secretary General Buğra Gökçe underscores a staggering 583% surge in rents nationwide between 2019 and 2023, with metropolitan cities witnessing an average increase of 697%. Antalya recorded the highest rent escalation at 1109%, followed closely by Mersin at 963%, Muğla at 935%, Ankara at 833%, and Istanbul at 713%. He added that the surge in rental rates surpasses even the escalation in the dollar exchange rate, marking an unprecedented spike in real estate prices (Öztürk, 2023).

According to data from The Central Bank of the Republic of Turkey (TCMB), residential and square-meter unit prices tripled

between 2010 and 2020, significantly exacerbating affordability issues (TCMB, 2020). The accessibility of affordable housing, particularly for low-income groups, has become increasingly complex, with social housing initiatives proving inadequate in quantity and affordability (Çetin, 2021). He notes that vulnerable populations encounter heightened challenges in obtaining suitable housing amidst escalating prices and scarce affordable alternatives.

#### 4. UNDERSTANDING *MUSHĀRAKAH* CONCEPT: AN OVERVIEW

The term *mushārahah*, meaning partnership, denotes capital partnership, or a contractual partnership. Modern usage often refers to companies formed by contract to avoid ambiguity. Classical fiqh doctrine divides *mushārahah* into three parts: capital partnership (*Shirkatu al-amwāl*), business partnership (*Shirkatu al-a'māl/al-abdān*), and credit/reputation partnership (*Shirkatu al-amwāl*) (Shubayr, 2007; Zuḥaylī, 1984). These partnerships are further categorized into '*Shirkatu al-Mufāwāḍah*' and '*Shirkatu al-inān*' parts, based on capital ratios, profit-sharing, loss-bearing rates, and partners' savings authority (Döndüren, 1997). According to classical fiqh, '*mushārahah*' equates to 'capital partnership' and falls under the '*Shirkatu al-inān*' category (İnanır, 2015). It involves two or more individuals investing specified capital and sharing ensuing profits and losses (Hammad 1996), resembling a joint-stock company (Bayındır, 2005). In such partnerships, profits need not align with capital, but losses do (Zayla'ī, 1973). Partners are not guarantors of each other but representatives. Thus, a qualified (*mumayyiz*) child can participate as a *wakīl* (representative). Partnerships can engage in general trade or specific sectors, not mandating all partners as *Muslims*. Under Islamic law, capital and profit must meet certain conditions (Kāsānī, 1974).

In classical *fiqh*, *mushārahah* equates to a capital partnership, resembling a joint stock company (İnanır, 2015; Hammad, 1996; Bayındır, 2005). Conditions include partners acting as agents, specific capital rights, and prohibiting debt-embezzled capital (Aynī, 2000). In interest-free banking, *mushārahah* funds commercial activities jointly managed by the bank and entrepreneur, forming agreed-upon capital (Tunç, 2010; Uddin and Okur 2023). Profit-loss-sharing occurs, with the entrepreneur receiving both profit share and labor reward. The partnership involves a business agreement, joint capital participation, and proportional profit sharing, for example, 60%, 40%, 70%, or 30%, regardless of the outcome (Tunç, 2010).

*Mushārahah*, a cornerstone of interest-free banking, ensures an equitable distribution of profits and returns. It involves the bank's capital contribution to projects, sharing ownership and management authority. The bank acts as the capital supplier, while partners handle operations. Profits and returns are shared among partners, reflecting the fairness of *Islāmic* finance principles. Unlike classical *fiqh*, modern partnerships can involve multiple individuals or entities, termed '*mushārahah*' instead of '*Shirkatu al-amwāl*'. Compared to *muḍārahah*, where the risk lies with the capital provider alone, *mushārahah* allocates risk to both capitalists and entrepreneurs (Çelik, 2017). While *muḍārahah* focuses on labor-capital partnership, *mushārahah* emphasizes capital, utilizing *muḍārahah* structures.

Often, *mushārahah* partnerships, a cornerstone of *Islāmic* finance, develop into *muḍārahah* setups following the need for capital management. In joint-stock companies, the operator and financiers assume roles akin to *muḍārib* and *rabbu'l-māl* (operator-financier), respectively. In interest-free banking, various entities can hold the operator's title. Within a *mushārahah*, however, any partner may take on this role, showcasing the adaptability and versatility of this system. *Islāmic* jurists differ on whether a bank or company can convert *muḍārahah* capital into investment by adding its own. According to Ḥanafīs and Ḥanbalīs, the manager (*muḍārib*) can add personal capital without consent, while Shāfi'īs require owner permission, and Mālikīs allow it under *muṭlaq* (absolute) *muḍārahah* contracts (Kāsānī, 1974; Mālik, 1324).

#### 4.1 TYPES OF MUSHĀRAKAH

*Mushārahah*, an *Islāmic* finance concept, manifests in several forms in modern business. However, there are two main types of *mushārahah*. In this type of *mushārahah*, none of the partners intends or will to leave the partnership after a certain period of time or only provide financing. The common and primary goal is to establish a business and grow the company further by making a profit from that business (Durmuş, 2011). Since this is the case, the partners' capital remains constant in principle, and at least it does not decrease by gradually transferring it to each other. For this reason, this partnership is called permanent/fixed *mushārahah* (Hasan, 2016).

#### 4.1.1. THE MECHANISM OF DIMINISHING PARTNERSHIP

The method of capital operation through a partnership that concludes with the transfer of ownership is termed ‘decreasing *mushārah*’ or ‘diminishing partnership.’

In classical fiqh, this form of partnership, which culminates in the transfer of capital, was not explicitly addressed. Originating in the 20th century (Bayındır, 2015) it emerged as a distinctive form of *mushārah*, initially implemented in the tourism sector in Egypt. This transaction, now known as ‘*al-Mushārah almutanāqīshah*’ or diminishing partnership, represents a specialized form of partnership arrangement in contemporary financial practices.

Within the context of interest-free financial institutions/banks, the ‘diminishing *mushārah*’ process involves a partnership structure where the institution's share gradually decreases until it is entirely transferred to the customer, who acts as the managing partner (Umrānī, 2010). This transaction is designed to provide interest-free financing and generate profits. Through this method, the bank, as a partner, engages in interest-free investments, thereby increasing its profits by effectively deploying its capital. Simultaneously, other partners involved in the arrangement benefit from interest-free financial resources to pursue their targeted investments in securities or real estate, all within the bounds of legitimacy. In contrast to permanent or fixed *mushārah* arrangements, DP offers various alternative banking services catering to diverse needs and preferences. Moreover, because the goods ultimately transfer to the customer, they are incentivized to work more diligently and actively, increasing the popularity of this method over other *mushārah* arrangements (Uddin, 2020).

A DP transaction is characterized by two or more individuals partnering in an income-generating venture. Within this arrangement, one party commits to gradually or entirely purchasing the shares of the other partner(s). As a result, while the share of one or all parties decreases until it reaches zero, the committed party ultimately assumes sole ownership of the project or property (Kawāmilah, 2006).

This partnership envisages the gradual transfer of the property right over a common asset from one of the partners, the financial institution, to the other partner, the customer, through successive independent sales contracts. As the financial institution's share in the partnership decreases, its share of the profit also decreases at the same rate, and at the end of the specified period, the ownership of the asset subject to the partnership is wholly transferred to the customer.

However, in this partnership, the parties also have the authority to sell their shares to each other or to third parties. The concept of DP, in addition to capital partnership in the doctrine, also includes *muḍārabah*, which ends with the transfer of ownership (Umrānī, 2010).

However, DP, a particular type of capital partnership, is used as an alternative to the compound *murābahah* method (Hassan, Hossain, and Muneeza, 2024), mostly by interest-free financial institutions in the North African region, to realize a project between the entrepreneur and the financial institution or to procure an asset such as tools and equipment (İnanır, 2017). This partnership is implemented in many areas that generate regular income, such as industry, trade, agriculture, tourism, transportation, service, health, construction, and energy sectors (Uddin, 2020).

#### 4.1.2 LEGAL ASPECT OF DP

Although opinions vary among contemporary *Islāmic* jurists, a prevailing consensus (*Ijmā'*) is that DP is a permissible and legitimate transaction, provided that it adheres to *Sharī'ah* principles and avoids any potential drawbacks, such as combining multiple contracts within one or stipulating one contract within another (Bayındır, 2005). *Islāmic* jurists have evaluated the processes involved in diminishing *mushārahah* from a fiqh perspective, leading to the emergence of six distinct approaches. These include viewing DP as *Shirkatul-milk*, *Shirkatu al-'inān* as a subset of *Shirkatul-a'qd*, a form of *muḍārabah*, a new contract, a contract with variable names based on its application, and a type of partnership resembling *Ijārah* (Kacı, 2020). However, upon closer examination, it has been determined that while DP shares similarities with these transactions, it does not precisely align with any single one. Instead, it represents a mixed or hybrid financial contract whose legal nature may vary depending on its specific formulation and execution. Furthermore, it has been noted that DP differs from permanent *mushārahah* and *Ijārah* in its outcomes, particularly in that it results in asset assignment rather than a straightforward sale (*Bay' al-Wafā'*) (Kawāmilah, 2006).

##### 4.1.2.1 DIFFERENT LEGAL ACTIVITIES INVOLVED IN DIMINISHING PARTNERSHIP

When the transactions in DP are examined in terms of contract theory, it is seen that it is not a single contract but a compound financial

contract consisting of several contracts (Ayub, 2017). Especially considering the DP methods applied in different ways, some have mixed financial contracts, while others have the characteristics of compound financial contracts. Sometimes, it is seen that the *Shirkatu al-‘inān* and the sales contract, sometimes the muḍārabah and sales contract, and sometimes the *Sharikatul-ijārah* and sale contract are combined in one contract. Today's *Islāmic* jurists generally agree regarding the permissibility of such a combination (Umrānī, 2010). According to this;

- a. The relationship between the managing partner/customer and the interest-free financial institution is a *Shirkatu al-‘inān* contract,
- b. A commitment (*ta‘ahhud*) contract stating that the interest-free financial institution will sell its shares to the managing partner, and the latter will purchase this share,
- c. The gradual transfer of the interest-free financial institution's shares to the managing partner's customer can be considered an installment sales contract (*‘Aqd Bay‘ al-taqṣīṭ*) (İnanır, 2017).
- d. If an interest-free financial institution rents a common asset to a customer or a third party, it constitutes an *Ijārh* contract.

A partnership that results in the transfer of immovable property ownership can be considered a *Shirkatu al-‘inān*. Here, the interest-free financial institution promises to transfer its partnership on the real estate, while the other partners promise to purchase this property. In this scenario, one of the parties (interest-free financial institution) provides capital support, while the other partner participates in the partnership with land and labor. In an *‘inān* partnership, it is unnecessary for both partners to actively participate in business management (Qudāmah, 1997). The profit to be generated here is shared according to the principles and rates determined in the contract. Although this partnership is mainly similar to the *‘inān* partnership, it differs from the *‘inān* partnership in that the capital of one of the parties is not cash, and it contains a promise regarding share transfer. In the *‘inān* partnership, however, the parties' capital must be in cash, and there should be no condition for a share transfer. While Ḥanafīs and Shāfi‘īs require capital to be in cash in the *‘inān* partnership, Mālikīs do not require this condition (Sarakhsī, 1993). However, whether the view of the Mālikīs is taken as a basis or the view of the jurists (Qudāmah, 1997) who say, "If the value of the goods included in the partnership can be determined in cash at the time

of the contract, even if they are not cash, an ‘inān partnership can be made with them," this difference does not pose a problem (Bayındır, 2015). Accordingly, based on the opinion that the *shirkat* contract containing the promise of transfer of ownership is permissible, it is concluded that the partnership practice that ends with the transfer of ownership, which interest-free banks implement, is permissible (Bayındır, 2005).

#### 4.1.3. PRACTICES OF DIMINISHING PARTNERSHIP

Different forms of diminishing *mushārahah*, a key concept in interest-free banking, emerge in practice. Today, we see its application on movable and immovable properties. Partnerships involving immovable property are mainly realized in the construction sector, such as building construction. Accordingly, the bank becomes a partner by providing capital to people who own land suitable for construction but cannot build on the land because they lack capital, and the bank provides project financing. The completed projects/buildings are assessed by selling or leasing them to generate profits. According to the contract, the bank gradually transfers its shares to its partner after a specified period, withdrawing from the partnership while receiving its share of the profits (Rammal, 2004). Partnerships involving movable property are established to facilitate the provision of items such as cars, machinery, tools, and equipment necessary for workplaces such as hospitals and workshops. The legal status of these transactions can differ depending on various factors. Capital partnership in diminishing *musharakah* is applied as follows in financing a project or purchasing real estate:

The financial institution/bank and the client—referred to as the managing partner, form a shared capital and become partners on a project with profit potential. The contract includes the following:

- a. Parties may lease their shares to third parties through a separate lease agreement or,
- b. The financial institution leases its shares to the managing partner with a separate lease agreement for a specific price and
- c. When terminating the partnership, the financial institution ensures a gradual transfer of shares to the customer, the managing partner, through successive contracts that are agreed upon beforehand. Each contract is independent in terms of construction, validity, and maturity. Profits and losses are aligned with respective shares, further emphasizing the benefits

of the process. Both the partnership and sale are executed in a single but separate contract (AAOIFI Shari'ah Standards, 2010). Parties commit to sharing rental income from purchased assets or the institution's share, fostering a sense of mutual gain. Property rights transition from the institution to the customer over an agreed period, decreasing the institution's rental share accordingly. Ultimately, ownership transfers fully to the customer (Umrānī, 2010), providing the audience with a sense of confidence in the process and its outcomes.

#### 4.1.4 DIMINISHING PARTNERSHIP METHOD FOR HOUSING FINANCING

The goal of the interest-free method of financing with DP is to reach an alternative to the mortgage housing financing method, which is widely applied through interest-bearing banks (Yanpar, 2014). However, the implementation of this method is as follows:

- a. The customer determines the house he wants to buy and collects information about the price and similar details, then;
- b. In the interest-free banking system, the customer initiates the process by approaching the bank and negotiating to purchase a specific property using the DP method. Subsequently, the customer enters into a contract with the bank, expressing the intention to acquire the identified property through this method. Additionally, the customer signs a rental agreement with the bank, stipulating the lease of the property to be purchased. At this point, both parties mutually agree to purchase and rent the property: for the customer, the objective is property ownership, while for the bank, it is to lease out the property and generate rental income. Notably, the customer, who is also the property's tenant, signs the rental agreement through the *mushārah* arrangement rather than directly with the bank. In practice, however, the bank facilitates and manages all transactions (Yanpar, 2014).
- c. The house is purchased, with 20% of the cost provided by the customer and 80% by the bank.
- d. The customer makes monthly payments to the bank, comprising a portion of the bank's share of the house and a rental fee. Consequently, the bank's ownership stake in the house diminishes monthly while the customer's shares increase. However, the customer's rental fee must constitute profit,

ensuring no loss occurs in principle. If the customer defaults on the house rent, a loss may occur. In such circumstances, the house will be sold, and the proceeds will be distributed between the bank and the customer based on their respective share status in the *mushārahah* partnership. Additionally, any outstanding rental fees owed by the customer will be collected (Alam and Ershad Uddin 2023).

- e. The monthly rent paid by the customer constitutes the profit of the *mushārahah* partnership, which is then shared between the bank and the customer based on their respective share ratios within the partnership. However, reimbursing this profit to the customer may lack significance. Alternatively, the customer could pay rent proportionate to the bank's remaining share in the property.

Upon the customer's acquisition of all the bank's shares in the DP, full ownership of the house transfers entirely to the customer (Yanpar 2014). The timing for the customer to receive the title deed can be established based on the agreement terms. Let us illustrate this with an example scenario;

Suppose Zimam and Erdoğan entered a DP agreement to purchase a house valued at \$1,000,000. They agree to contribute equally to the purchase price. Therefore, each initially invests \$800,000 and \$200,000, with 80% and 20%, respectively. They also agree that Tawqer will gradually buy out Zimam's share over ten years. According to their agreement, Erdoğan pays Zimam a portion of the rental income generated from the property each month. Simultaneously, Erdoğan increases his ownership share in the property by paying Zimam an additional amount. Erdoğan will own the property outright at the end of the ten years.

- $A$  is Zimam's initial investment, which is \$800,000.
- $B$  as the initial investment by Erdoğan, which is \$200,000.
- $P$  is the total property value, which is \$1,000,000.
- $R$  as the monthly rental income generated.
- $M$  is the agreement's duration in months, which is  $10 \times 12 = 120$  months.
- $x$  as the additional amount paid by Erdoğan each month to increase his ownership share.

For example, Ownership Share:

Zimam's initial ownership share ( $X_A$ ) is 80% of the property value, and Erdoğan's initial ownership share ( $X_B$ ) is 20%:

$$\begin{aligned} \text{Equation (1)} \\ X_A &= \frac{A}{P} \times 100 = \frac{800,000}{1,000,000} \times 100 = 80\% \\ X_B &= \frac{B}{P} \times 100 = \frac{200,000}{1,000,000} \times 100 = 20\% \end{aligned}$$

Monthly Payments:

- Erdoğan pays Zimam a portion of the rental income each month, which is  $X_B \times R$ .
- Erdoğan also pays Zimam an additional  $x$  amount to increase his ownership share.
- So, Erdoğan's total monthly payment to Zimam is  $X_B \times R + x$ .

Total Payment Over Ten Years:

- Erdoğan will make these payments over  $M=120$  months, so the total payment ( $T$ ) can be calculated as:  
 $T = M \times (X_B \times R + x)$
- Zimam's initial ownership share is 80%, and Erdoğan's is 20%.
- Erdoğan pays Zimam cap X sub cap B  $\times R + x$  monthly to increase his ownership share.

Erdoğan's total payment to Zimam over ten years is  $T = M \times (X_B \times R + x)$ .

This equation ensures that Zimam receives a portion of the rental income each month and gradually sells his share of the property to Erdoğan. This is just a simplified representation of how DP works mathematically. In practice, factors such as profit-sharing ratios, rental agreements, and payment schedules may vary based on the parties' specific terms.

## 5. DISCUSSION OF DIMINISHING PARTNERSHIP

In terms of transactions and contracts, defining and explaining the method in a single legal transaction is impossible. The partnership, cooperation, and financing system being implemented presents a complex contractual structure, both in terms of the relationship between the parties and the relationship of the parties with the organizing company. It is observed that there is more than one contract within the system. Contemporary legal systems have realized that the

classical contract classification is insufficient to explain some economic and financial transactions and create their legal framework. They have had to include different contract types in the system. One of these contracts is an intangible financial contract.

When looking at a new model that combines more than one contract, it is made together for these and similar reasons. However, making a combined contract does not always mean eliminating religious drawbacks. The contracts must also be revised according to Sharia principles (Uddin 2025). In order to eliminate all these drawbacks, the system must be analyzed by putting it into concepts and clarifying which legal procedure fits in the *Islāmic* legal system and whether there is a conflict with the basic principles (Uddin 2023).

This system adopts a traditional Gold Day logic for savings and collaboration, reminiscent of the practices often associated with homemakers. Under this system, rooted in a cooperative mindset, prospective homebuyers determine the desired house's price range and affordability for installment payments. Subsequently, they join a suitable group where members cooperate and support one another in achieving homeownership. Essentially, participants in the same group financially assist each other in acquiring homes.

Since multiple types of contracts are combined in this model, it can be analyzed in terms of financial contracts. Initially, the partners establish a partnership or company among themselves, resembling the '*Shirkatu al-'inān*', a contract company in the classical system. With the pooled funds, one member becomes a homeowner each month. The monthly contributions are then allocated to the partner selected to purchase a house. As the property does not yet belong to this partner, rent is paid to the other partners in proportion to their shares; installment payments continue. As the installments are fulfilled, the purchasing partner's stake in the house increases while other partners' shares decrease. In this regard, the relationship between the homeowner and the other members aligns with the concept of a 'diminishing partnership' (DP).

In this DP, one of the parties acquires ownership of the house at an ever-increasing rate with the payments they make, while the share of the others decreases in the process. However, this should be considered as a particular type of decreasing *mushārah*. Accordingly, in the lottery system, the partner who comes out first in the lottery becomes the owner of the entire house when he pays the last installment. In this way, a new member is hosted every month. In each house purchased, each of the other members who have not yet purchased a house becomes a partner in proportion to the payment they

make. As a result, at the end of the maturity period, everyone in the group becomes a homeowner.

Under the lottery system, it is possible to consider the organization fee received by the company as a proxy fee. The company puts forth effort to organize this business, opens branches, employs staff and experts, provides equipment, and carries out various activities, especially advertising, to find new members, and spends for all these. In addition, it receives a kind of mandate from each member to form a suitable group to which that member can belong. For this reason, it would not be right to consider this fee as a fee received in return for a loan and consider it as interest. However, this fee must be within reasonable limits and repaid in a manner that will not cause any loss to the member leaving the partnership. If this fee is not for profit and can be kept within the actual cost limit as much as possible, there will be no harm in terms of Sharia.

## 6. CONCLUSION

The diminishing partnership method is a significant financing tool within *Islāmic* economics and interest-free banking. It operates on the fundamental principle of profit-loss sharing and facilitates the gradual transfer of ownership through independent sales contracts. While this method resembles other financial mechanisms such as *muḍārabah*, financial leasing, and installment sales, its adoption by interest-free banks remains limited because of various economic, social, and financial factors rather than purely fiqh-related reasons.

One of the primary hurdles to the widespread implementation of DP lies in the need for more legal legislation and the absence of necessary infrastructure. Efforts to remove these obstacles and establish a legal framework for alternative financing methods, including leasing, could pave the way for greater utilization of such mechanisms within interest-free banking systems.

The DP contract inherently involves promises related to the purchase and sale of shares and the risks associated with gradually exiting the partnership. Overcoming these challenges necessitates a deeper understanding of such transactions' economic, legal, and accounting dimensions. Moreover, the potential of interest-free financial institutions, particularly in real estate acquisition, holds promise for addressing the economic challenges posed by the current interest-based system. For instance, the Diminishing Property Partnership method offers a viable avenue for individuals to acquire

property without interest, shielding both parties from the adverse effects of inflation.

Furthermore, the broader adoption of interest-free financing methods, such as DP, can contribute to economic growth, employment generation, and poverty alleviation. Directing small savings toward productive investments and fostering equitable access to housing can transform economic landscapes, particularly in Turkey.

In light of the current economic challenges stemming from interest-based systems, exploring and adopting alternative financing methods grounded in *Islāmic* principles offer a promising pathway toward sustainable economic development. Concerted efforts, however, are needed to overcome existing barriers and create an enabling environment to implement interest-free financial mechanisms effectively. Through collaborative action and a commitment to *Islāmic* economic principles, the DP method and similar approaches can play a pivotal role in shaping more equitable and prosperous economies.

Turkey has significant potential in interest-free banking since it enjoys global transaction volume and market shares. However, it has yet to significantly differentiate itself from the conventional banking system regarding infrastructure and personnel training. Interest-free banking products often need more competitiveness than conventional offerings, mainly regarding financial costs. Addressing these challenges requires establishing a strong legal framework for alternative interest-free banking financing systems. Offering alternative savings financing methods could accelerate collection in default cases and prevent customer victimization. By enhancing legal infrastructure, providing incentives, and rethinking enforcement practices, Turkey can unlock the full potential of participation banking and foster a more competitive and inclusive financial sector, benefiting consumers and contributing to the overall stability and growth of the Turkish economy. The diminishing partnership system, with its structure and practical functioning, is often discussed in the literature section, but more guidance is needed on integrating this system into existing legislation, which can help reduce the housing crisis and foster other small-medium entrepreneurship businesses in the country.

## REFERENCES

- AAOIFI Shari'ah Standards. "Shari'a Standards, Accounting and Auditing Organization for Islamic Financial Institutions." Bahrain, 2010.
- Ābidīn, M.A.I. 'Umar. *Radd Al-Muhtār 'alā al-Durr al-Mukhtār*, 5 Beirut: 'Ālam al-Kutub, 1984.
- Akçay, Ü. and A. R. Güngen. "The Making of Turkey's 2018-2019 Economic Crisis." *Institute for International Political Economy (IPE)*, no. 120 (2019): 79-104.
- Alam, M.K., and A. Ershad Uddin. "Legal and Regulatory Frameworks For Shari'a Governance Practices in the Islamic Banking Industry of Bangladesh." *Mizanü'l-Hak: İslami İlimler Dergisi*, no. 17 (December) (2023): 663–88.
- Amin, H., A. Rahim, and D.A. Razak. "Consumer Acceptance of Islamic Home Financing." *International Journal of Housing Markets and Analysis* 7, no. 3 (2014): 307–32.
- Asadov, A., Z.M. Sori, S.M. Ramadilli, Z. Anwer, and S.V. Shamsudheen. "Musharakah Mutanaqisah Home Financing: Issues in Practice." *Journal of Islamic Accounting and Business Research* 9, no. 1 (2018): 91–103.
- Aynī, A.M.B. *Alibnāyah Fī Sharḥ Al-Hidāyah*, 6 Beirut: Dār al-Kutub al-'Ilmiyah (2000).
- Ayub, M. "İslamî Finansı Anlamak İktisat Yayınları-9." In *İslami Finans Dizisi-I*. İstanbul (2017).
- Bayındır, S. "Bir Finansman Yöntemi Olarak Kullanılan Sermaye Ortaklığının İslâm Hukuku Açısından Değerlendirilmesi." *Usûl İslâm Araştırmaları* 3 (2005): 139-57.
- Bebercuma, H. "Mortgage Konut Finansman Sistemi ve Türkiye'deki Yapı." Doctoral Dissertation, Marmara University, 2006.
- Bendjilali, B., and T. Khan. "Economics of Diminishing Musharakah." Occasional Paper no. 42. Jeddah: Islamic Research and Training Institute, 1995. <https://ideas.repec.org/p/ris/irtiop/0042.html>
- Çakmaklı, C., S. Demiralp, S.K. Özcan, S. Yeşiltaş, and M. Yıldırım. 2020. "COVID-19 and Emerging Markets: An Epidemiological Model with International Production Networks and Capital Flows." *IMF Working Paper*, no. 133: 1–64.
- Çelik, İ. "Bir Yatırım Aracı Olarak Mudarebe ve Günümüzde Kullanımı." *Al-Farabi Uluslararası Sosyal Bilimler Dergisi* 1, no. 3 (2017): 381–95.

- Çetin, AC. “Türkiye’de Konut Fiyatlarına Etki Eden Faktörlerin Analizi.” *Journal of Applied Science of Mehmet Akif Ersoy University* 5, no. 1 (2021): 1–30.
- Coşkun, Y. “Konut Fiyatları ve Yatırımı: Türkiye İçin Bir Analiz.” *Niğde Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi* 9, no. 2 (2016): 201–17.
- Dinc, Y. “A Suggestion on Mortgage Financing of Islamic Banks: Diminishing Musharakah.” *International Journal of Trade, Economics and Finance* 1, no. 8 (2017): 25–31.
- Döndüren, H. *İslam Hukukuna Göre Alım-Satımda Kar Hadleri*. Bursa: İslam Hukuku Külliyyatı Yayınları, 1983.
- Durmuş, A. *İslam Hukuku Açısından Günümüz Kredi ve Finansman Yöntemleri*. İstanbul: Ensar Neşriyat, 2011.
- Erdem, M., and H. Tatli. “Potential of Islamic Finance as Alternative Financing Option for SMEs.” *International Journal of Economics, Management and Accounting* 32, no. 2 (2024): 377–402.
- Erkoyun, E., and D. Butler. “Turkey Central Bank Stuns Market with 500-Point Rate Hike to 50%.” *Reuters*, March 21, 2024. <https://www.reuters.com/markets/rates-bonds/turkey-hikes-key-rate-500-points-50-surprise-move-2024-03-21/>.
- Gül, A.B. “Türk Bankacılık Sisteminde Konut Kredileri: İpotek Teminatlı Menkul Kıymet ve İpoteğe Dayalı Menkul Kıymet Uygulamaları.” *Finansal Araştırmalar ve Çalışmalar Dergisi* 916 (2017): 39–58.
- Hammad, N. *İktisadî Fıkıh Terimleri Sözlüğü*. İstanbul: İz yay, (1996).
- Hasan, Z. “Islamic is the Diminishing Musharakah Model Used for Home Financing?” *Turkish Economic Review* 3, no. 3 (2016): 343–452.
- Hassan, M.K., M.M. Hossain, and A. Muneeza. *Hire Purchase Under Shirkah Al-Milk (HPSM) in Islamic Banking and Finance: A Shari’ah Analysis*. Palgrave Macmillan Cham: Switzerland, 2024.
- Hussen, M.S. “Government Financial Incentive and Firm Performance: Evidence from Turkey.” *International Journal of Economics, Management and Accounting* 30, no. 2 (2022): 259–83.
- İbeçoğlu, M.G. “Türkiye’deki Katılım Bankacılığı Uygulamasında Konut Finansmanı İçin Alternatif Bir Yöntem: Azalan Ortaklık Sistemi.” *Kırklareli Üniversitesi Sosyal Bilimler Dergisi* 7, no. 1 (2023): 135–54.

- İnanır, A. “İslâm Hukuk Düşüncesinde Bileşik (Mürekkep) Mâli Sözleşmeler.” *Uluslararası İslam Ekonomisi ve Finansı Araştırmaları Dergisi* 3, no. 1 (2017): 7–39.
- Kacı, T. “Katılım Bankacılığında Uygulanan Finansal Kiralama Yöntemindeki Risk Faktörünün İslam Hukuku Açısından Değerlendirilmesi.” *Manisa Celal Bayar Üniversitesi Sosyal Bilimler Dergisi* 18, no. 3 (2020): 454–66.
- Kameel, A, M. Meera, and D.A. Razak. “Home Financing through the Musharakah Mutanaqisah Contracts: Some Practical Issues.” *Journal of King Abdulaziz University: Islamic Economics* 22, no. 1 (2009): 3–27.
- Kāsānī, A.B.M. *Badā'i' Al-Şanā'i' Fī Tartīb al-Sharā'i'*, 6. Beirut: Dār al-Kutub al-‘İlmīyah, 1974.
- Kawāmilah, N.A.K. *Al-Mushārah Almtnāqsh Wa-Taṭbīqātuhā al-Mu'āşirah: Al-Bank al-Islāmī al-Urdunī Namūdhajan*. Kuala Lumpur: IIUM Press, 2006.
- Kaya, N.E., and B. Gönültaş. “Merkez Bankaları Sıkılaşmayı 2023'te Zirveye Taşdı.” *Anadolu Ajansı*, December 30, 2023. <https://www.aa.com.tr/tr/ekonomi/merkez-bankalari-sikilasmayi-2023te-tasidi/3096116>.
- Loundy, D. “Islamic Mortgages.” In *Contemporary Islamic Finance: Innovations, Applications, and Best Practices*, 283–92. New Jersey: USA: Wiley, 2013.
- Mālik, Anas I. *Al-Mudawwanah al-Kubrā Riwāyah Şahnūn*, 5 Saudi Arabia: Wizārat al-Awqāf al-Sa‘ūdīyah-Maṭba‘at al-Sa‘ādah, 1324.
- Moghul, U.F. *A Socially Responsible Islamic Finance: Character and the Common Good*. London: Palgrave Macmillan, 2017.
- Öztürk, F. “Konut Krizi: Kiralar 4 Yılda En Az 6 Kat Arttı, Yatırımcı Uzaklaştı, Bankalar Kredi Vermeye Gönülsüz.” *BBC*, June 5, 2023. <https://www.bbc.com/turkce/articles/c3g0xylry03o>.
- Paylan, M.A., and Y.B. Kavas. “The Effect of Reduced Perceived Financial Well-Being on Domestic Product Purchasing Behavior: The Case of Turkey During COVID-19.” *International Journal of Economics, Management and Accounting*, (2021): 331–60.
- Qudāmah, A..M. *Al-Mughnī*, 5 Riyadh: Dār ‘Ālam al-Kutub, 1997.
- Rammal, H.G. “Financing Through Musharaka: Principles and Application.” *Business Quest*, (2004): 1–7.
- Rosly, S.A. *Critical Issues on Islamic Banking and Financial Markets: Islamic Economics, Banking and Finance*,

- Investments, Takaful and Financial Planning*. Indiana: Authorhouse, 2005.
- Sabırsız, E., and M. Şöhret. “6 Şubat Depremlerinin Türkiye Ekonomisi Üzerindeki Makroekonomik, Sosyal ve Çevresel Etkileri.” *Akademik Yaklaşımlar Dergisi* 15, no. 1 (2024): 571–97.
- Sarakhsī, A.B.M. *Al-Mabsūṭ*. 11. Beirut: Dār al-Ma‘rifah, 1993.
- Sari, Ö.B.Ö. “The Turkish Housing System: An Overview.” In *Housing in Turkey*, 1st ed., 11–29. Routledge, 2022.
- Selim, M. “Financing Homes by Employing Ijara-Based Diminishing Musharaka.” *International Journal of Islamic and Middle Eastern Finance and Management* 13, no. 5 (2020): 787–802.
- Shubayr, M.U. *Al-Mu‘āmalāt al-Mālīyah al-Mu‘āsirah Fī al-Fiḥ al-Islāmī*. Amman: Dar Al-Nafaes, 2007.
- Smolo, E., and M.K. Hassan. “The Potentials of Musharakah Mutanaqisah for Islamic Housing Finance.” *International Journal of Islamic and Middle Eastern Finance and Management* 4, no. 3 (2011): 237–58.
- Tanrivermiş, H. “Possible Impacts of COVID-19 Outbreak on Real Estate Sector and Possible Changes to Adopt: A Situation Analysis and General Assessment on Turkish Perspective.” *Journal of Urban Management* 9, no. 3 (2020): 263–69.
- “TCMB.” Central Bank of the Republic of Türkiye, 2020. <https://www.tcmb.gov.tr/>.
- Tunç, H. *Katılım Bankacılığı: Felsefesi, Teorisi ve Türkiye Uygulaması*. 8th ed. İstanbul: Nesil Yayınları, 2010.
- Uddin, A.H.E. “Bangladeş’teki İslam Bankacılık Uygulamasının Fikhî Açından İncelenmesi.” Doktora Tezi, Marmara Üniversitesi Sosyal Bilimler Enstitüsü, 2020.
- \_\_\_\_\_. “Economic and Social Make-Over in Turkey: By Erdogan.” *International Journal of Economics, Management and Accounting* 26, no. 1 (June 2018): 135–55.
- \_\_\_\_\_. *The Regulation of Islamic Financial Institutions (IFIs) and Ethical Oversight in South Asia: An Islamic Law Perspective*. Cham: Springer-Verlag GmbH, 2025.
- Uddin, A. E. “The Perplexing Issue Of Monopoly (İhtikār) In Islamic Law And Its Negative Impact On Society: Evidence From Turkey’s Perspective.” *Dinbilimleri Akademik Araştırma Dergisi* 23, no. 2 (September 2023): 805–30.
- \_\_\_\_\_, and H. Okur. “Empowering Communities: Redefining Zakat Distribution in Bangladesh Post-Covid-19.” *Kocatepe İslami İlimler Dergisi* 6, no. 2 (2023): 419-38.

- Umrānī, A.M. *Al-'Uqūd al-Mālīyah al-Murakkabah : Dirāsah Fiqhīyah Ta'şīlīyah Wa-Taṭbīqīyah*. Riyadh: Kunuz Ishbilya Publisher, 2010.
- Uras, U. Owning a Home a Dream: Housing Crisis Hits Turks Ahead of Polls. *Aljazeera*, 2023. <https://www.aljazeera.com/news/2023/5/5/owning-a-home-a-dream-housing-crisis-hits-turks-ahead-of-polls>.
- Yanpar, A. *İslami Finans*. İstanbul: Scala Yayıncılık, 2014.
- Zayla'ī, A. Y. *Naşb Al-Rāyah Li-Aḥādīth al-Hidāyah*. Vol. 3. Riyadh: Mu'assasat al-Rayyān, 1973.
- Zuḥaylī, W. *Al-Fiqh al-Islāmī Wa-Adillatuh*. Dimashq: Dār al-Fikr, 1984.