



## LIBYAN INVESTORS' INTENTION TO INVEST IN ISLAMIC SUKUK: THEORY OF PLANNED BEHAVIOUR APPROACH

Abdullah Mohammed Awn<sup>1i</sup>,  
S. M. Ferdous Azam<sup>2</sup>

<sup>1</sup>Management & Science University,  
Malaysia

<sup>2</sup>Graduate School of Management,  
Management & Science University,  
Malaysia

### Abstract:

**Purpose:** The purpose of this study is to study the factors that influence the attitude of Libyan investors on investing in Islamic bonds. **Design / Methodology / Approach:** A modified questionnaire was used in this study to answer research questions and test the evolving hypothesis. Questionnaires containing 39 items were distributed and collected from 409 respondents as representatives of investors in Libyan banks. The data collected was analyzed using PLS SEM. **Results:** The results obtained using the theory of planned behavior (TPB) indicate that knowledge of Islamic Sukuk, perceived control and the impact of Sharia compliance have an important positive relationship with the attitude towards investing in Islamic sukuk. In practical terms, the results indicate that there is no significant difference in investment in Sukuk between Libyan investors, based on the gender of the investors. **Originality / value:** the current study is the first of its kind to be conducted in Libya. as far as the authors know, there are no studies that focus specifically on socio-economic factors that affect investor intention to trade in sukuk. The result of the study may be useful in countries with similar banking cultures such as Libya. Socially, the result will be beneficial for Libyan investors by helping them explore the benefits of the Sukuk product as one of the less risky and most profitable Islamic financial products.

JEL: D25; E22; G11

**Keywords:** attitude; knowledge, perceived control, Shari'ah-compliance, investors, Libya, theory of planned behavior (TPB)

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<sup>i</sup> Correspondence: email [abdallaaon@gmail.com](mailto:abdallaaon@gmail.com)

## 1. Introduction

“Sukuk” stands for certificates and is the plural of sak, which means a certificate in Arabic (Iqbal & Mirakhor, 2007). Sukuk are financial instruments issued by sovereign entities or corporations aiming at financing various projects (Duqi, A., & Al-Tamimi, H., 2019). Conversely, other authors such as (Cakir & Raei, 2007; Safari & Ariff, 2014) claim that Sukuk are quite distinct from conventional bonds in many aspects including their return, price behavior and risk mitigation benefits to investors. Similarly, Sukuk entitle the investor to a proportional ownership of the underlying asset in the Sukuk financing structure, while bonds are merely a debt instrument (Jamaldeen, 2012). The authors conclude that the instruments of investment instruments seem to provide benefits of diversification of the portfolio due to the low volatility and dynamic link paths. In the same vein, (Haque, et al., 2017) Analysis of the relationship between sukuk and bond markets. Their findings also support a causal relationship between sukuk and bonds. They also found that, in the long run, sukuk markets generally lead the bond markets (Smaoui, H., & Ghouma, H., 2020). The Islamic bond, known as sukuk, is an ethical financing avenue driven by religious and profit motives (Abd Majid, et al., & Mohamad, N. R., 2020).

Several authors have indicated that there are no scholarly articles dealing with factors that influence Muslim investors' choice of products and services that comply with Islamic law (El-Bassiouny, 2014). In this paper, we aim to bridge this gap by grouping Libyan investors' choice of products in Sharia-compliant financial instruments based on several factors based on previous literature. We believe that by doing this, the study adds depth to the knowledge base about investor behavior by investigating such behavior in the context of unconventional Islamic financial products. Using both a qualitative and quantitative methodology to analyze attitudes toward Sharia-compliant financial products and services, this study also adds breadth to the debate about these products and services as perceived by investors. By focusing only on Sharia-compliant financial products and services instead of conventional products, this study enriches the knowledge base of this under-represented area. Finally, the unique nature of this part of the world in terms of wealth and debt makes this study important to many stakeholders such as investors, policy makers and banks alike.

More specifically, this research aims to understand whether investors can be grouped in Libya based on their choice of products and services compatible with Islamic law such as Sukuk (Islamic bonds) and Islamic derivatives.

## 2. Rationale of the Study

The theory of planned behaviour TPB, is a development of the TRA, also developed by (Fishbein & Ajzen, 1975). This theory introduces perceived behaviour as a new indicator of intention in addition to the attitude and subjective norms. This theory was used in a few studies on Islamic banking and economics. Studies (Alam et al., 2012; Amin et al.,

2014b), applied the theory successfully and extended the model to include further determinants like “religiosity” and “Islamicity of product”, model regarding the influence of that knowledge of Islamic Sukuk, Perceived Control and Shari’ah-compliance on investors’ attitude towards the actual invest of Sukuk either in Libya or any part of the world. Hence this study addresses this knowledge gap by adopting the theory of Planned Behavior (TPB) to predict the investors’ (Bank customers) to invest of Sukuk in Libya.

Based on this implication, the present study undertook the initiative to further investigate the application of the theory of planned behavior (TPB) to predict the investors’ (Bank customers) to invest of Sukuk in Libya by examining the mediating effect of Attitude Towards Investment in Islamic Sukuk in the relationship between perceived behavior control (PC)/Shari'ah-Compliance (SC)/ knowledge of invest in Islamic Sukuk(KS) and Intention to Invest in Islamic Sukuk (IIS). The main components of the TPB are a person’s own attitude, subjective norms, perceived behavioral control, intentions, and behavior (Ajzen, 1988).

### 3. Literature Review and Hypothesis Development

In Islamic Financial System, there are certain guidelines and rules that the organizations have to follow in the Islamic Investment, the transactions or activities must be dealt with the ethical sectors only. Ethical sectors mean that when the organization make an investment, they have to invest their wealth in a permissible activity. This is because the profit that they are going to earn should not come from the unlawful activities such as gambling, production of liquor, pornography and etc., (Billah, M. M. S., 2019).

The study focused on issuing new and relatively few Sukuk. To our knowledge, there are only two studies that have been conducted in this matter and (Warsame & Ireri, 2016) have determined the intention of the investor Qatar towards the instruments using the theory of planned behavior (TPB) as well as the study (Ashidiqi, C., & Arundina, T., 2017) who identified also, Indonesia students’ intention to invest in Sukuk: Theory of Planned Behavior Approach. This study found that positions are the only factor that determines the investor’s intention towards Islamic Sukuk. The research on the intention to issue Sukuk differs from a large number of previous experiences, and the research focused on the intention towards financing and Islamic Sukuk between individual customers or investors in banks. Several efforts have been made to study the intention of examining customer intent towards Islamic and banking finance products. These papers are (Tahir & Bramble, 2011; Amin, 2012; Jate Worthington, 2015; Ltifi et al., 2016).

Some research has found that the employee factor, the religious factor, and the quality of service are important factors that drive customer intent towards financing the Islamic direction and banking services (Jaafar & Musa, 2016). Also studied the intention of small and medium businessmen in Malaysia towards Islamic finance using the developed TPB model. In this research, he showed that all the factors of TPB are important in determining the intention of bank and corporate customer towards Islamic

finance, with the attitude towards accepting Islamic products having the greatest impact. There has been a lot of research into individual investors' investment decisions (Lewellen et al., 1977; Nagy & Obenberger, 1994; Clark-Murphy & Soutar, 2004; Kumar & Lim, 2008; Seasholes & Zhu, 2010; Barber & Odean, 2013; Korniotis & Kumar, 2011). However, very limited research has been done in the Libya context (one of a developing country) regarding individuals' intention to participate in financial markets (Alshaebi, M. A., & Yaacob, A. C., 2019). This is due to the limited Islamic banks that have extensive knowledge and experience with the market that makes their Sukuk products compatible with Islamic Sharia related.

### **3.1 Theory of Reasoned Action (TPB)**

Theory of planned behavior (TPB; Ajzen, 1991) was assumed as a theoretical reference model. According to TPB, the direct precedent for behavior is the intention to do. Intention is influenced by attitude toward behavior, self-norm, and perceived behavioral control (PC). contributes to predicting both intention and behavior. TPB has already been successfully applied to a wide range of behaviors including. Regarding additional predictors, a number of studies considered past behavior (e.g. Carfora, Caso, & Conner, 2016; Hagger, Polet, & Lintunen, 2018) and subjective norm (e.g., Carfora et al., 2016; Rise, Sheeran, Hookelberg, 2010; Reed, Sparks, & Jessup, 2018). The inclusion of past behavior in TPB is especially justified when it is seen that the behavior is affected by the habit (Conner & Armitage, 1998). Indeed, the repeated behavior of the behavior, as in the case of an investment, moves it from a logical process, as defined by TPB, to an automatic process. The above behavior increased the shares of variance shown in investment intentions and behaviors. However, the analysis The latest meta-analysis by (Hagar et al. 2018) showed that the inclusion of past behavior resulted in significant attenuation of the direct effect of intention on behavior and other indirect effects of TPB construction on behavior (Canova, et al., & Manganelli, A. M., 2020). In addition, results suggest that the theory of planned behaviour is appropriate to model individuals' behavioral intention and can be used to tailor marketing activities aiming at increasing people's pro-environmental behaviour (Grilli, G., & Notaro, S. 2019).

This study attempts to understand the intentions of investment decision of bank customers on "planned behavior theory" (TPB) with two additional structures - for example Shari'ah-Compliance and knowledge, in addition to the basic components of the TPB model - i.e. Perceived Control and attitude. The sample consists of Libyan bank customers because it is distinct from other sectors in terms of knowledge of Islamic products.

#### **3.1.1 Intention to Invest in Islamic Sukuk**

Intention is an indication of how willing an individual is to try to make efforts to do a certain behavior (Ajzen, 2005). The intention will remain a tendency to act until efforts are made to change the intention into behavior. According to TPB, the intention is the function of three basic factors, the first is the personal factor of the individual (attitudes),

the second is social influence (subjective norm) and the third is related to the controls that belong to the individual. The intention in this research indicates an individual's willingness to invest in Islamic Sukuk. The study conducted on Malaysian public companies by (Godlewski, Turk, & Weill 2011), states that entrepreneurs opt for Sukuk if they expect a low profit thus minimizing their losses in the likely event of failure, while others will opt for conventional bonds if they expect high profit thus increasing their profit in the likely event of success. (Similarly, et al., & Mayhew, 2005), states "*stock market participants will expect that the worst borrowers to choose to issue Sukuk and will interpret such issuance as a negative signal on the financial position of the issuing firm*" (Warsame, M. H., & Ireri, E. M. 2016).

### **3.1.2 Attitudes towards Investment in Islamic Sukuk**

Attitude is important in predicting and explaining human behavior as mentioned by (Ajzen 1991; Azjen & Fishbein 1980), refers to attitude as the degree of an individual's favorable or unfavorable evaluation of the behaviour. In another view, (Shook & Bratianu, 2010), argued that individual's attitude towards subject matter can be formed through individual's beliefs in the possible outcomes. Several studies have been conducted pertaining to the relationship between attitude and behavioral intention in a different context. For instance, (Sudan, Geoffrey & Hanudin, 2009; Mokhtar & Butt, 2012), found that attitude and subjective norms were positively related to the intention of choosing halal products among consumers (Husni, et al., & Hassan, F. 2019). Attitude is a key factor that influences the performance of a person on a certain behavioral intention (Amin et al., 2017; Lajuni et al., 2017). This means that an individual's higher attitude towards Islamic Sukuk significantly influences the behavioral intention towards the usage of Islamic banking services.

Mamdani (2002) stated that attitude is instrumental in determining customer behaviour. However, once the attitude towards Islamic banks mediates the relationship between both variables and the intention to use Islamic banks, the relationship is positive between them. This indicates that as long as attitudes toward Islamic banks exist, cost and benefit are not important in influencing the intention to use Islamic banks (Albaity, M., & Rahman, M., 2019).

### **3.1.3 Shari'ah-Compliance**

Interpretation of Shari'ah-Compliance exhibits a high degree of subjectivity. In Islamic Sukuk structuring, there are governing clauses which necessitate the role of Shari'ah-Compliance scholars in conflict resolution through an arbitration process and finding convergence in Shari'ah opinion about a particular Sukuk structure, both locally and globally (Oseni & Hassan, 2015; Hassan et al., 2018). Scholars will inevitably have different views on the appropriateness of certain Islamic Sukuk structures, as will Shari'ah committees. Consequently, Islamic finance involves a "thoughtful process" where scholars look at the merits of each case and take a view on a case-by-case basis. Arguably, the collective expert opinion and screening synergy of a Shari'ah committee is

likely to provide a more credible signal of Shari'ah-Compliance than an individual's opinion (Azmat et al., 2017; Godlewski et al., 2016; Oseni et al., 2016).

Shari'ah intermediaries can reduce investors' risk exposure from the structural complexity and Shari'ah-Compliance issues intrinsic to Islamic asset-based finance. Consequently, Islamic Sukuk issuers who hire reputable agents to certify their offerings receive economic benefits in the form of lower spreads (Halim, et al., & Hassan, M. K. 2019). Evidence suggests that unethical corporate behavior can lead to significant valuations for investors, mainly from damage to corporate reputation (Armor et al., 2017). Thus, investors view Shari'ah-Compliance's corporate ethics, which are pillars of its financial performance (Abidin et al., 2017), as important in ensuring a sustainable business environment. From the investor's point of view, the ethical investment path with ethical values, and Shari'ah-Compliance has the potential to build a contractual relationship based on trust and not just on self-motivated and profitable interests (Cohen et al., 2010).

The Islamic Sukuk, is introduced to fulfill the muamalat in compliance with Shari'ah laws. Malaysia, being one of the more aggressive players of Shari'ah-compliant finance (Karim, 2010), has dominated the market for Sukuk with a total issuance of 62.5 % of global Sukuk as of 2017 (IIFM, 2018, p. 57). The Shari'ah-compliant bond, which is known as Sukuk, is deemed as an ethical financing choice. The evidences of prior studies support the notion that funds based on screening criteria, such as that of Sukuk, may provide a stable source of funding for investment decisions (Abd Majid, et al., & Mohamad, N. R., 2020).

### **3.1.4 Knowledge of Invest in Islamic Sukuk**

The knowledge of sukuk has increased, not only among Muslims but also among non-Muslims. Non-Muslims are able to relate to the application of sukuk as the instruments are akin to the conventional bond with respect to cash flows and risk. Nonetheless, it is different in certain basis which makes it better compared to conventional bond (Bhuiyan, Rahman, Saiti, & Ghani, 2018; El Mosaid & Boutti, 2014; Shahar & Jamlus, 2014).

In the context of Malaysian Islamic banking, Ibrahim et al. (2017) identified that knowledge had a significant impact on a customers' intention to use Islamic financing products and services. Generally, knowledge plays an important role in affecting a customer's intention to use Islamic financing products. Accordingly, the managers of Islamic banks need to conduct a special study to assess and understand customers' attitudes towards the Islamic Sukuk products offered by Islamic banks. The growing trend of Islamic banking services has an attractive feature for both Muslim and non-Muslim customers (Jalil & Rahman, 2014; Gilani, 2015).

Another feature that makes sukuk more special than conventional bonds is the ability of investors to compensate for their investment if bad circumstances take place. This could be done as the investment is sheltered by the asset-based contract Sukuk (Razak, S. S., Saiti, B., & Dinç, Y., 2019). However, the importance of Knowledge and

behavioral factors is increasingly recognized in studies of individual habits (Banter et al., 2008; Mehdizadeh et al., 2017a; Oyeyemi et al., 2014).

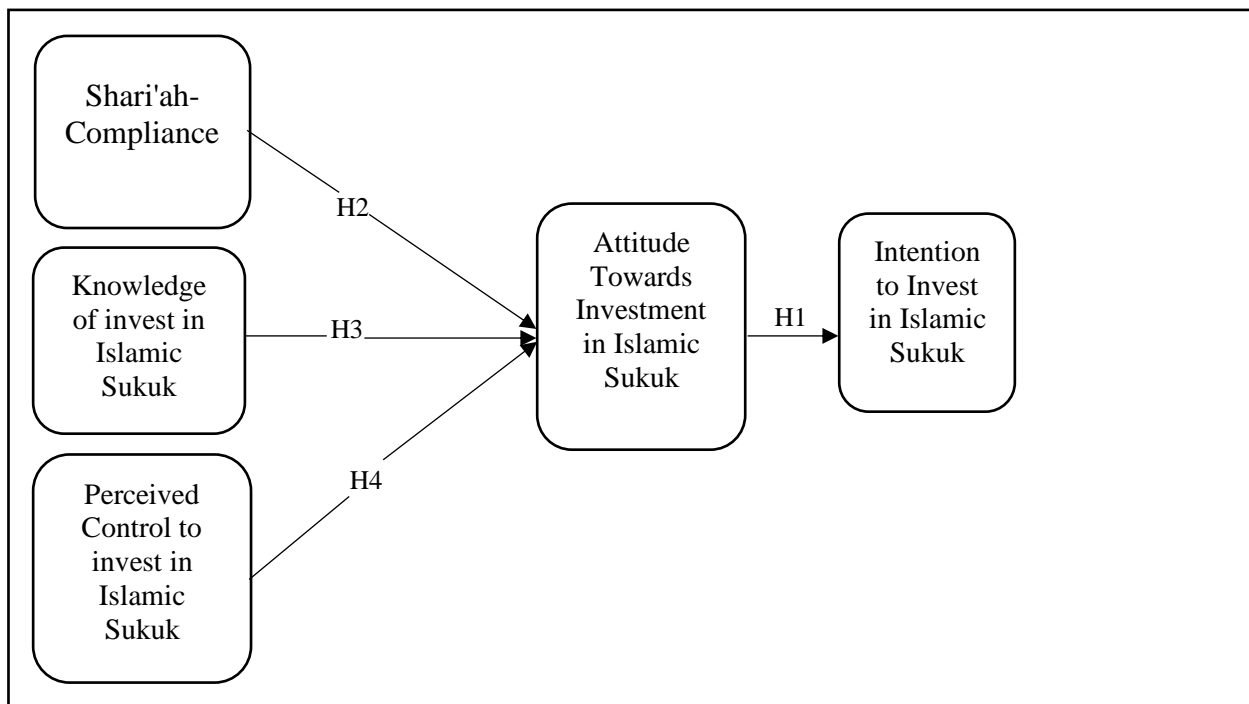
### **3.1.5 Perceived Control to Invest in Islamic Sukuk**

Perceptive behavioral control is the individual's perception of the ease or difficulty of performing a specific behavior (Ajzen, 2005). Perception is determined by belief, and control of behavior. Control belief is the individual's assumptions about the existence of factors that support or hinder individuals from performing behavior. Control beliefs depend on an individual's experience about behavior, information about behavior, and various other things that can influence an individual's opinion about the ease or difficulty of performing a particular behavior. While perceived behavior control is the individual's assumption about how strong his feelings are towards each of these factors that support and impede such behavior. Based on previous research (Khurram & Bukhari, 2011; Bot et al., 2011; Amin et al., 2017).

The quality of customer service and product features in addition to adequate knowledge about Islamic banking products and services are the main factors that determine the extent of customer acceptance of Islamic Sharia-compliant products (Ashidiqi, C., & Arundina, T., 2017). In a study conducted in Malaysia by Salmat and (Abdul-Kadar 2012), Islamic bank customers emphasized the importance of fast and efficient bank services, confidentiality on their bank accounts, reputation of the bank and the image of the bank as their main patronage factors in selecting a bank. Promotion of Islamic education has also been found to be an essential factor in the creation of awareness about Islamic banking products and services (Zainuddin et al., 2004).

## **4. Theoretical Model Structure**

A framework of the research model that comprises the explored hypotheses is shown in Figure 1. The framework is based on a comprehensive and methodical literature review. This theoretical framework is an extended version of TPB, which includes a new construct, namely knowledge and Shari'ah-Compliance. Therefore, this study systematically examined the impacts and the relationships between Perceived Control, knowledge, Shari'ah-Compliance and attitude towards Investment in Islamic Sukuk in Libya.



#### 4.1 Attitude of the Individual's Behavior

According to (Ajzen & Fishbein 1980), attitude is a feeling and thinking in a stable way. It is also the ability of an individual to interact in a positive or negative manner towards a specific situation. The process of assessing an individual's behavior can be a tendency to accept the purchase of any favorable or unfavorable product. According to many studies, position is a valid and reliable indicator of intention and behavior (Huda et al., 2012; Olnaz et al., 2010). Attitudes and intent toward investing are the main factors adopted in this study as the situation can positively or negatively affect the intention to invest in Islamic bonds (Raza, et al., & Qureshi, M. A. 2019). Moreover, the investors' behavior and behavior regarding intention to Sukuk has a positive impact on service quality and overall satisfaction (Butt & Aftab, 2013). Moreover, the situation plays a vital role in changing one's behavior and intent. It was noted that the situation had a positive and significant impact on the intention to accept the Islamic product (Echchabi et al., 2016; Souiden & Jabeur, 2015; Setyobudi et al., 2015; Butt & Aftab, 2013; Abdul Rahman & Mohd Daud, 2010).

Additionally, this study also examined the mediating role of the position in investigating the intention to invest in the use of Islamic Sukuk, (Shi et al. 2008) assume that understanding the mediating role of the situation develops the quality of inferences and makes a significant contribution to the current study, (Kleijnen et al., 2004; Shanmugam et al., 2014) found that the position had an essential role as a broker in the context of financial banking. Such results have also been supported by (Ismail & Venten, 2007; Aslam, & et al., 2017) who studied the attitude of individuals mediating the relationships between some explanatory factors and the behavioral intention of consumers, (Additionally, M.-Yassin et al., 2009), also provided empirical support that



the position is a good intermediate variable with the intent to purchase. Moreover, in the context of electronic banking services in Islamic banks, (Mansour & et al., 2016), found that the situation appeared as a completely mediating factor for the behavioral intentions of bank customers. Therefore, the hypothesis will be:

**H1:** Attitude has significant and positive effect on the Intention to Invest in Islamic Sukuk.

#### **4.2 Shari'ah-Compliance and Attitude Towards Investment in Islamic Sukuk**

In this paper, Shari'ah-Compliance has been defined as the role of debt in influencing the intention of investors to invest in sukuk. There is many previous research proving that the religious factor influences the financial investment decision, (Hamida & El-Sala, 2009; Amin et al., 2011; Abu Yousef et al., 2015; Suwaidan & Rani, 2016), found that the religious factor has a major influence on investors' decision to choose Islamic financing. In general, any investor aiming to generate profitable gains or expecting to reduce the expected losses should remember that mixing the Islamic stock and Islamic Sukuk returns to better protect his position is recommended; thus, he may conduct his future transactions in the Islamic stock-bond markets, (Shahzad, et al., & Shahbaz, M., 2019). The theoretical and projected applied perspectives in analytical finance presented in this paper provide a methodological worldview for all areas of social finance with ethical consciousness. Such analytical approach is much needed today in the reconstruction of global finance in the scale of ethics and away from the sole focus on capital market efficiency (Choudhury, M. A., 2018). Shari'ah-compliant institutions are more beneficial for society than their conventional counterparts, (Abu-Bakr, 2016). Moreover, a study based on the Gulf countries showed that Shari'ah-compliant firms pay more dividends than their counterparts (Azam, et al., & Mohy-Ud-Din, K., 2019).

The impact of Shari'ah-Compliance on public attitudes towards Islamic banks. Many studies have proved the stronger influence of Shari'ah-Compliance as compared to religion in effecting individual's behavior and decision making (Essoo & Dibb, 2004; McDniel & Burnett, 1990). According to (Hirschman, 1983), like any other variable, Shari'ah-Compliance highly effect a person's life in terms of his wealth accumulation, studies, life style, pursuits, family members and the major decisions a person may undertake in his life, (Zaid, Z., 2019). Islamic Shari 'the legal law considered in performing all the worldly affairs by a Muslim. Thus, Muslims would consider the principles of Shari'ah before expressing or developing their positive or negative attitude towards any object (Rehman & Shabbir, 2010). Their attitudes towards any object would be sensitive to its legal status from Shari'ah perspective to not circumvent any law or teaching from the Islamic Shari'ah (Newaz, Fam, & Sharma, 2016). In line with many studies in existing literature who studied the influence of Shari'ah-Compliance on attitudes towards Islamic banks and financial products (Lee & Ullah, 2011; Faisal, Akhtar, & Rehman, 2014; Souiden & Rani, 2015; Newaz, Fam, & Sharma, 2016; Souiden & Rani, 2015; AbouYoussef, Kortam, AbouAish, & El-Bassiouny, 2015), Thus we hypothesize that:

**H2:** Shari'ah-Compliance has significant and positive effect on the attitude towards Invest in Islamic Sukuk.

#### **4.3 Knowledge and Attitude towards Invest in Islamic Sukuk**

The importance of information availability, issuance of Sukuk and source features for investors One of the main factors that can increase the popularity of Sukuk and Islamic financial assets. The preference for investors, in general, is the increased knowledge of investors about their privacy compared to traditional trends. For Islamic banks to attract new clients, it is vital for them to understand their needs in the first place (Lo & Leow, 2014). Islamic bank customers stress the importance of fast, efficient and reputable banking services.

Bank image and competitive service fee (Warsam & Airy, 2016). In the context of Sukuk, there is evidence that knowledge inconsistency can be higher for Sukuk rather than conventional bonds (Klein & Weill, 2016). Generally, Sukuk can be chosen in place of bonds by companies that have increased knowledge asymmetry to prevent effective market surveillance. (Godlewski et al., 2013) shows that Sukuk is the preferred choice for low-quality companies while investment grade companies choose traditional bonds because they do not want to share a higher share of the profits with the investors in the Sukuk. (Halim et al. 2017) You find that higher-facing companies are more likely to issue equity and debt agency Sukuk than conventional bonds. Sukuk issuers with a high agency cost of underinvestment are likely to undertake collateral and more inclined to use SPV (Ebrahim et al., 2016). However, if an individual has knowledge of a brand, then awareness of its brand is high (Valkenburg & Buijzen, 2005; Lu et al., 2014). Brand awareness is part of brand knowledge as noted by (Keeler 1993). Likewise, brand knowledge is the degree of consumers Familiar with any product characteristics, design, and service (Keeler, 1993; Barreda et al., 2015). Previous research found that the limited number of Muslims using Islamic banks arose due to a lack of knowledge of Islamic banking products (Islam and Rahman, 2017; Obada & Kabashy, 2016). Previous studies that linked knowledge of the, attitude and intention to use different Islamic tools indicated a positive link (Md Husain & Ab Rahman, 2016, Chaouch, 2017; Kaabachi & Obeid, 2016; Bassir et al., 2014; Dusuki & Abdullah, 2007; Rimal & Zürburg, 2007; Amin et al., 2011; Thambia et al., 2010; Aziz et al., 2017). Based on these considerations, we assume the following: the intention to invest in Islamic bonds, we hypothesis that:

**H3:** Knowledge has significant and positive effect on the attitude towards Invest in Islamic Sukuk.

#### **4.4 Perceptive Behavioral Control and Attitude towards Invest in Islamic Sukuk**

Perceived behavioral control describes an individual's identification and evaluation of factors that make it difficult to perform a particular behavior, while attitudes toward behavior (invest in Islamic Sukuk) symbolize a person's appreciation of the costs associated with performing the behavior. As described in TPB it is suggested that each factor affects behavioral intent (Barr-Pulliam, D., 2017). Perceived behavioral control

reflects previous experience as well as anticipated impediments and obstacles. To sum, the more advantageous the attitude and subjective norm related to a behavior and the greater the perceived behavioral control, the stronger the individual intention to perform the behavior, the important prediction factors of intention, attitude, subjective norm, and perceived behavioral control, are expected to vary across behaviors and situations (Hsu, M. S. 2012). Perceptive behavioral control is the belief in perceived ease or difficulty in performing behavior (Japutra et al., 2019; Seow et al., 2017) Previous literature has recognized a set of constraints or barriers to investment such as cost, policies, safety, and government policies (Han et al., 2019; Solomon, 2019; Solomon, 2019) attempted to test the applicability of TPB amongst Libyan investors backed by perceived behavioral control as the strongest indication of an individual's attitude and thus on intention. Elsewhere, an attempt by (Duarte et al., 2015) seeking to understand behavioral intent among visitors, found that perceived behavioral control is one of the important indicators of attitude and intentions (Hamid, et al., & Mohamad, et al. 2019). Therefore, it can be assumed that:

**H4:** Perceptive behavioral control has significant and positive effect on the attitude towards Invest in Islamic Sukuk.

## 5. Research Methodology

### 5.1 Samples

Using the survey approach, a total of 500 participants participated in a face-to-face survey that was conducted on customer of Islamic banks in Libya. The reason for choosing this field is that it provides Islamic banking and investment banking products and services to bank customers. 409 answers were captured at a rate (81.8%), then used for the final analysis. The data that has been collected will be analyzed using two different methods. The first method is descriptive analysis which will be used to analyze the demographic data of respondents on the first two part of the questionnaire. While the third part of the questionnaire which consisted of TPB questions will be analyzed using Structural Equation Modeling (SEM). The author performs SEM analysis following the stages recommended by (Hair et al., 2009). Those stages are measurement model, structural model with their respective validity and reliability test. Then hypothesis testing is conducted by looking at the value of t-statistic and standard loading factor.

### 5.2 Data Collection

The data collection techniques used in this research are questionnaires of survey methods with bank customers as respondents. The questionnaire consists of two parts. The first section contains questions about the demographic data of respondents. The second section contains the main questionnaire questions that contain 39 indicators of closed questions. Closed questions using Likert scale 1-7 which means Option 1 strongly disagree and 7 means strongly agree. The questionnaire was distributed among Libyan bank customers face-to-face to respondents to facilitate the author's increase in the

number of respondents. The sampling technique used is non-probability sampling, depending on the availability and accessibility of respondents (Sugiyono, 2007).

## 6. Results and Discussion

### 6.1. Descriptive Analysis

**Table 1: The Demographic data of the Respondents (N = 409)**

Demographic Items	Number of Respondents	Percent
<b>Gender</b>		
Male	307	75.1%
Female	102	24.9%
<b>Total</b>	<b>409</b>	<b>100.0%</b>
<b>Age of the respondent</b>		
20-30	66	16.1%
31-40	170	41.5%
41-50	154	37.7%
51 and above	19	4.7%
<b>Total</b>	<b>409</b>	<b>100.0%</b>
<b>Academic Qualification</b>		
Total Diploma and less	64	15.6%
Bachelor	186	45.5%
Master	119	29.2%
PhD	39	9.5%
Other	1	0.2%
<b>Total</b>	<b>409</b>	<b>100.0%</b>
<b>Current Occupation</b>		
Employee	288	70.4%
Private business (free business)	87	21.3%
Investor in the stock market	2	0.5%
Housewife	6	1.5%
Student	26	6.3%
<b>Total</b>	<b>409</b>	<b>100.0%</b>
<b>Do you have an account?</b>		
Yes	396	96.8%
No	13	3.2%
<b>Total</b>	<b>409</b>	<b>100.0%</b>

Table 1 above shows the demographic characteristics of the respondents. From the table it can be known that the majority of respondents' gender is were male (75.1%) and obtained at least a bachelor's degree (45.5%). Moreover, they also maintained bank accounts (96.8%) at the time. Moreover, respondents were mostly under 40 years of age (41. 5%).The literature review shows that Libyan societies are predominantly Muslim, with about (97%) of Libyan Sunni Muslims, although customer attitudes are the main factor influencing individual behavior (Alter et al., 2013). Several publications (such as Amin, 2008; Amin et al., 2009, 2014a; Ismail et al., 2014; Muhammad Tayyib et al., 2008),

indicate that Muslims are, to some extent, more inclined to choose Islamic banking products that comply with the principles of Sharia. Hence, they are more likely to look for affordable investments in the future.

## 6.2 Structural Equation Modeling (SEM) Analysis

PLS-SEM is one of the statistical tools used in many fields of studies and can estimate very complex models with few observations without affecting the distributional assumptions of the data. PLS-SEM. In this section will be explained about the results from the SEM) analysis. This research will use the six stages analysis that recommended Hair et al. (2009). Is very useful for both exploratory and perception studies that are theoretically based and data-rich (Hair, Ringle, & Sarstedt, 2011; Hair, Hollingsworth, Randolph, & Chong, 2017; Hair, Sarstedt, Ringle, & Mena, 2012; Sarstedt et al., 2014). In this section will be discussed in the next three stages of the model which is the measurement model, the structural model and validity and reliability test of both models.

## 6.3 Measurement Model Analysis

The measurement model of PLS-SEM is used to verify whether the indicators are able to present the variables. To achieve this, Precisely, the normality test comprises of the convergent validity, Internal consistency and reliability and discriminant validity, while multicollinearity was tested using SPSS. Firstly, the convergent validity via Average Variance Extracted (AVE) was used to measures the extent to which the items represent the latent construct and how they relate with other measures of the same latent construct (Fornell & Larcker, 1981; Hair et al., 2006). To test the reliability of the measurement model author will use the Construct Reliability (CR). The measurement model can be considered reliable if all variables have CR value more than 0.7 and AVE more than 0.5. The validity test of the measurement model is seen from the value of the standard loading factor and t-statistics of each indicator. The value of the standard loading factor should be more than 0.6 and t - statistics more than 1.67 so that the measurement model is considered valid (Hair et al., 2009). Consistent with the recommendation of Chin (1998), the values of AVE in table 2 exhibit high loadings ( $p > 0.5$ ) on their constructs indicating good convergent validity of the model.

**Table 2:** Convergent validity and the Internal consistency and Reliability (N = 409)

Latent Variables	Cronbach Alpha	Composite Reliability	Average Variance Extracted (AVE)
Shari'ah-Compliance Attitude Towards Investment in Islamic Sukuk	0.903	0.932	0.776
Intention to Invest in Islamic Sukuk	0.945	0.960	0.858
Perceived Control over Investment knowledge of invest in Islamic Sukuk	0.951	0.962	0.836
	0.911	0.937	0.789
	0.935	0.950	0.792

On the contrary, the reliability of structures was evaluated using compound reliability (range  $\geq 0.6$ ) (Bagozzi et al., 1998) and Cronbach's  $\alpha$  (range  $\geq 0.7$ ) (Hair et al., 1998). To assess the measures of internal consistency of the model necessitates evaluation of compound reliability, while traditionally, Alpha Cronbach has been used to assess the construction in the measurement model (Cronbach and Meehl, 1955; Yamagata & Terracciano, 2011; Peterson & Kim, 2013). Extracted variance (AVE) (range  $\geq 0.5$ ) (Hare et al., 1998) and discriminatory validity using the Pearson Correlation Matrix, where correlations between combinations should be less than 0.8 (Brown, 2015). Moreover, the acceptable values of Cronbach alpha should be greater than 0.5, compound reliability above 0.7 (Chin, 1998; Sarstedt et al., 2014). Table 2 indicates that all compound reliability values were greater than 0.7 and that Alpha Cronbach for all combinations was above 0.5, which indicates that the model is suitable for further study and analysis.

**Table 3: Cross-loading of the Variables (N = 409)**

	SC	AT	IIS	PC	KI
SC01	<b>0.904</b>	0.794	0.498	0.581	0.560
SC02	<b>0.902</b>	0.745	0.539	0.619	0.577
SC03	<b>0.895</b>	0.752	0.566	0.646	0.575
SC04	<b>0.819</b>	0.659	0.475	0.532	0.454
AT01	0.790	<b>0.921</b>	0.508	0.570	0.532
AT02	0.768	<b>0.933</b>	0.553	0.614	0.539
AT03	0.758	<b>0.916</b>	0.505	0.573	0.502
AT04	0.795	<b>0.936</b>	0.540	0.588	0.561
IIS01	0.528	0.488	<b>0.923</b>	0.763	0.498
IIS02	0.521	0.476	<b>0.935</b>	0.753	0.525
IIS03	0.600	0.616	<b>0.912</b>	0.757	0.524
IIS04	0.551	0.536	<b>0.904</b>	0.706	0.522
IIS05	0.497	0.476	<b>0.895</b>	0.664	0.444
PC01	0.675	0.652	0.705	<b>0.898</b>	0.583
PC02	0.559	0.514	0.789	<b>0.915</b>	0.499
PC03	0.626	0.585	0.644	<b>0.855</b>	0.528
PC04	0.538	0.487	0.701	<b>0.884</b>	0.581
KI01	0.469	0.385	0.397	0.450	<b>0.900</b>
KI02	0.480	0.461	0.417	0.464	<b>0.887</b>
KI03	0.594	0.532	0.516	0.582	<b>0.942</b>
KI04	0.471	0.419	0.447	0.495	<b>0.922</b>
KI05	0.653	0.667	0.598	0.668	<b>0.793</b>

Table 3 below shows the value of the indicator the validity and reliability of the measurement model. From the table we know that the value of the standard loading factor of all indicators are more than 0.6. So, it can be concluded that the measurement model reliable. The value of Construct Reliability (CR) and Average Variants Extracted (AVE) of each variable also above 0.7 and 0.5. Thus, the present study used the cross-loadings to measure the discriminant validity of the model. (Chin, 1998), suggested that all the indicator loadings should be higher than the cross-loadings in any model. The result obtained shows that all indicator loadings were higher than the cross-loadings.

Thus, the measurement model can be considered valid. Because the measurement model passed all test, so it can be in processed to structural model stage.

#### 6.4 Hypothesis Testing

The results in this research showed that the basic structures of (TPB) theory, the attitude to invest in Islamic Sukuk ( $\beta = 0.74$ ;  $t = 16.40$ ;  $p < 0.001$ ) were positively and concretely related to the intention to invest in the Sukuk, thus providing support for H1.

**Table 4:** Result of the structural Model (N = 409)

Hypothesis	Relationship	Beta Coefficient	T- Statistics	P-Values
H1	Attitude → Intention	0.74	16.40	0.000
H2	Shari'ah-Compliance → Attitude	0.62	18.90	0.000
H3	knowledge → Attitude	0.06	1.40	0.163
H4	Perceived Control → Attitude	0.09	2.06	0.040

The result in Table 4 indicates that hypothesis H2, which assumed a positive relationship between Shari'ah-Compliance and attitude towards investment in Islamic Sukuk was supported because investment in banking products must be compatible with Sharia law ( $\beta = 0.62$ ;  $t = 18.90$ ;  $p < 0.001$ ), Thus, providing support to previous studies, e.g. (Lee & Ullah, 2011; Faisal, Akhtar, & Rehman, 2014; Souiden & Rani, 2015; Newaz, Fam, & Sharma, 2016; Souiden & Rani, 2015; AbouYoussef, Kortam, AbouAish, & El-Bassiouny, 2015; Azam, et al., & Mohy-Ud-Din, K. 2019). However, hypothesis H3 suggested a positive relationship between knowledge and the attitude towards investing in Islamic Sukuk, the result obtained did not support the hypothesis, ( $\beta = 0.6$ ;  $t = 1.4$ ;  $p > 0.01$ ). Hypothesis H4, which anticipated a relationship between the Perceptive behavioral control and attitude towards invest in Islamic Sukuk, was supported ( $\beta = 0.09$ ;  $t = 2.06$ ;  $p < 0.05$ ). The study depicts the benefit of (TPB) in predicting the investment intentions of individual investors from potential Islamic bank customers in the future.

#### 7. Limitations and Further Research Opportunities

This study has some limitations. The study design is more exploratory than fully representative. Hopefully, the future attempts will be able to make a better survey design covering a larger area, with larger sample sizes, or wider age ranges. More complex methods can be used, such as modeling the structural equation. In this study, like other investment behavior studies, we are not able to measure the effects of broader political or banking planning decisions because of the difficulty of linking these decisions to behavior and perceptions. Such a study requires a form of longitudinal analysis. However, the results of this study provide new local knowledge, and it can help policy makers in the Libyan country, or similar countries, to create better investment planning.

## 8. Discussion and Conclusions

This study is the first of kind as the reviewed literature had not used the theory of planned behavior (TPB) model. The purpose of the study was to examine Libyan investors' perceptions of their investment decision in Islamic Sukuk and whether they prefer to invest in Islamic Sukuk or other Islamic banking products. A modified questionnaire was submitted in English and Arabic. The results indicate that knowledge about the properties of the Sukuk may not likely inspire the investors to invest in Sukuk. On the other hand, the findings of the study prove that the Libyan investors have a positive attitude towards investment which in turn shaped their intention to invest in Sukuk. This was followed by the Shari'ah-Compliance as expected, followed by Perceived control over investment positively influenced the intention of the investors to invest in Sukuk, which means that the Libyan investors have control over their resources. This study has shown that perceived behavioral control, and compatibility of Sharia, have a direct positive relationship with the attitude towards investment. More importantly, the somewhat planned behavior theory proved to be an important theory in predicting the adoption of investment in Sukuk among Muslims. In fact, the direct positive relationship was supported by previous studies in some other context conducted by (Khalek et al, 2015; Alam & Sayuti, 2011; Sudin, Geoffrey & Hanudin, 2009; Mokhtar, Butt & Hasbullah, 2012; Khairi & Aziz, 2015; Raza, et al., & Qureshi, M. A., 2019).

## References

- Abd Majid, N., Ariff, A. M., & Mohamad, N. R. (2020). The role of related party transactions on Sukuk financing. *Journal of Islamic Accounting and Business Research*.
- Abu-Youssef, M., M., H., Kortam, W., Abou-Aish, E., El-Bassiouny, N. (2015). Effects of religiosity on consumer attitudes toward Islamic banking in Egypt, *International Journal of Bank Marketing*, 33 (6), 786 - 807.
- Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl, & J. Beckmann (Eds.), *Action Control: From cognition to behavior* (pp. 11e39). Berlin, Heidelberg: Springer Berlin Heidelberg.
- Ajzen, I. (1991). The Theory of Planned Behavior: Some unresolved issues. *Organizational Behaviour and Human Decision Processes*, 50, 179-211.
- Ajzen, I. (2002). Constructing a TPB Questionnaire: Conceptual and methodological considerations. Working Paper. Amherst: University of Massachusetts [http://chuang.epage.au.edu.tw/ezfiles/168/1168/attach/20/pta\\_41176\\_7688352\\_57138.pdf](http://chuang.epage.au.edu.tw/ezfiles/168/1168/attach/20/pta_41176_7688352_57138.pdf).
- Ajzen, I., & Driver, B. (1992). Application of the theory of planned behavior to leisure choice. *Journal of Leisure Research*, 24(3), 207.



- Ajzen, I., & Fishbein, M. (1980). *Understanding Attitudes and Predicting Social Behavior*. Englewood Cliffs, New Jersey: Prentice-Hall
- Albaity, M., & Rahman, M. (2019). The intention to use Islamic banking: an exploratory study to measure Islamic financial literacy. *International Journal of Emerging Markets*.
- Alshaebi, M. A., & Yaacob, A. C. (2019). The Application of Islamic Financial Accounting Standards in Libyan Islamic Banking Sector: Challenges and Analysis. *al-Qanatir: International Journal of Islamic Studies*, 16(1), 59-77.
- Ashidiqi, C., & Arundina, T. (2017). Indonesia Students' Intention to Invest in Sukuk: Theory of Planned Behaviour Approach. *International Journal of Economic Research*, 14(15), 395-407.
- Aslam, W., Ham, M. and Arif, I. (2017). Consumer behavioral intentions towards mobile payment services: an empirical analysis in Pakistan, *Market-Tržište*, Vol. 29 No. 2, pp. 161-176.
- Azam, M., Akhtar, J., Ali, S. A., & Mohy-Ud-Din, K. (2019). The moderating role of Shari'ah compliance on the relationship between firm profitability and CSR activities. *International Journal of Ethics and Systems*.
- Barr-Pulliam, D. (2017). The relationship between internal audit assurance frequency and earnings manipulation intent and behavior: A theory of planned behavior approach. Available at SSRN 3093735.
- Bhuiyan, R. A., Rahman, M. P., Saiti, B., & Ghani, G. B. M. (2018). Financial Integration between Sukuk and bond Indices of emerging markets: Insights from wavelet coherence and multivariate-GARCH analysis. *Borsa Istanbul*.
- Bilhah, M. M. S. (2019). Islamic Financial Planning. In *Islamic Financial Products* (pp. 351-367). Palgrave Macmillan, Cham.
- Butt, M.M. and Aftab, M. (2013). Incorporating attitude towards halal banking in an integrated service quality, satisfaction, trust and loyalty model in online Islamic banking context, *International Journal of Bank Marketing*, Vol. 31 No. 1, pp. 6-23.
- Canova, L., Bobbie, A., & Montanelli, A. M. (2020). Predicting fruit consumption: A multi-group application of the Theory of Planned Behavior. *Appetite*, 145, 104490.
- Carfora, V., Caso, D., & Conner, M. (2016). The role of self-identity in predicting fruit and vegetable intake. *Appetite*, 106, 23-29.
- Choudhury, M. A. (2018). The ontological law of Taw hid contra 'Shari'ah-compliance' in Islamic portfolio finance. *International Journal of Law and Management*.
- Duqi, A., & Al-Tamimi, H. (2019). Factors affecting investors' decision regarding investment in Islamic Sukuk. *Qualitative Research in Financial Markets*.
- Ebrahim, M. S., Jaafar, A., Omar, F. A. and Salleh, M. O. (2016). Can Islamic injunctions indemnify the structural flaws of securitized debt?, *Journal of Corporate Finance*, Vol. 37 No. 1, pp. 271-286.
- Echchabi, A., Azouzi, D. and Aziz, H.A. (2016). The future prospects of Islamic banking in Tunisia: an empirical survey, *Euro Med Journal of Business*, Vol. 11 No. 1, pp. 119-131.

- El Mosaid, F., & Boutti, R. (2014). Sukuk and bond performance in Malaysia. *International Journal of Economics and Finance*, 6(2), 226-234.
- El-Bassiouny, N. (2014). The one – billion – plus marginalization: toward a scholarly understanding of Islamic consumers, *Journal of Business Research*, Vol. 67 No. 2, pp. 42-49.
- Godlewski, C. J., Turk-Ariss, R. and Weill, L. (2013). Sukuk vs. conventional bonds: a stock market perspective, *Journal of Comparative Economics*, Vol. 41 No. 3, pp. 745-761.
- Grilli, G., & Notaro, S. (2019). Exploring the influence of an extended theory of planned behaviour on preferences and willingness to pay for participatory natural resources management. *Journal of environmental management*, 232, 902-909.
- Hager, M.S., Polet, J., & Lintunen, T. (2018). The reasoned action approach applied to health behavior: Role of past behavior and test of some key moderators using met analytic structural equation modeling. *Social Science & Medicine*, 213, 85–94.
- Reid, M., Sparks, P., & Jessop, D.C. (2018). The effect of self-identity alongside perceived importance within the theory of planned behaviour. *European Journal of Social Psychology*, 48, 883-889.
- Hair Jr., et al. (2009). *Multivariate Data Analysis: A Global Perspective (7th ed.)*, the Upper Saddle River: Prentice Hall.
- Halim, Z. A., How, J., Verhoeven, P., & Hassan, M. K. (2019). The value of certification in Islamic bond offerings. *Journal of Corporate Finance*, 55, 141-161.
- Halim, Z.A., How, J. and Verhoeven, P. (2017). Agency costs and corporate sukuk issuance, *Pacific Basin Finance Journal*, Vol. 42 No. 1, pp. 83-95.
- Hamid, A. H. A., & Mohamad, M. R. (2019). Validating Theory of Planned Behavior with Formative Affective Attitude to Understand Tourist Revisit Intention.
- Hezbollah, N. A., Khairi K. F., and Aziz, M. R. (2015). *Intention to Contribute in Corporate Waqif: Applying the Theory of Planned Behaviour*. International Journal of Islamic and Civilizational Studies. Penrite UITM Press.
- Hsu, M. S. (2012). A study of internship attitude, subjective norm, perceived behavioral control, and career planning of hospitality vocational college students. *Journal of Hospitality, Leisure, Sport & Tourism Education*, 11(1), 5-11.
- Huda, N., Rina, N., Mardoni, Y. and Putra, P. (2012). The analysis of attitudes, subjective norms, and behavioral control on Mozaki's intention to pay zakat, *International Journal of Business and Social Science*, Vol. 3 No. 22, pp. 271-279.
- Husni, N. S. A., Alwi, S. F. S., & Hassan, F. (2019). Determinants of Behavioral Intention Towards Green Investments: The Perspectives of Muslims smah Osman (Corresponding Author) Masturah Ma'in Ruhaini Muda. *International Journal*, 4(1), 16-38.
- Ibrahim, A. N. H., Burhan, M. N., & Rahman, R. A. O. (2020). Understanding Users' Intention to Use Park-and-Ride Facilities in Malaysia: The Role of Trust as a Novel Construct in the Theory of Planned Behaviour. *Sustainability*, 12(6), 2484.

- Jaffar, M. A., & Moses, R. (2016). Determinants of attitude highly and Intention Toward Islamic Financing undo Non User Adoption, *Procedia Economics and Finance*, 37, 227 - 233.
- Jati, W. R. (2015). The demographic Bonus as the Engine of Economic Growth: window of opportunity or Disaster Window Indonesia, *Population*, 23, 1-19.
- Khalek, A. A., Ismail S. H., and Ibrahim, H. M. (2015). A study on the Factors Influencing Young Individual's Muslim Behavioral Intention in Consuming Halal Food in Malaysia. *Journal Sariah*, 23(1), 79-102.
- Klein, P. O. and Weill, L. (2016). Why do companies issue sukuk?, *Review of Financial Economics*, Vol. 31 No. 1, pp. 26-33.
- Lo, C. W. and Leow, C. S. (2014). Islamic banking in Malaysia: a sustainable growth of the consumer market, *International Journal of Trade, Economics and Finance*, Vol. 5 No. 6, p. 526.
- Mehdizadeh, M., Mamdoohi, A., Nordfjaern, T. (2017a). Walking time to school, children's active school travel and their related factors. *J. Transp. Health* 6, 313–326.
- Rani, N., S., M., (2016). Consumer attitudes and purchase intentions toward Islamic banks: the influence of religiosity, *International Journal of Bank Marketing*, 33 (2), 143 – 161.
- Raza, S. A., Ahmed, R., Ali, M., & Qureshi, M. A. (2019). Influential factors of Islamic insurance adoption: an extension of theory of planned behavior. *Journal of Islamic Marketing*.
- Razak, S. S., Saiti, B., & Dinç, Y. (2019). The contracts, structures and pricing mechanisms of Sukuk: A critical assessment. *Borsa Istanbul review*, 19, S21-S33.
- Setyobudi, W. T., Wiryono, S. K., Nasution, R. A. and Purwanegara, M. S. (2015). Exploring implicit and explicit attitude toward saving at Islamic bank, *Journal of Islamic Marketing*, Vol. 6 No. 3, pp. 314-330.
- Shahzad, S. J. H., Aloui, C., Jammazi, R., & Shahbaz, M. (2019). Are Islamic bonds a good safe haven for stocks? Implications for portfolio management in a time-varying regime-switching copula framework. *Applied Economics*, 51(3), 219-238.
- Smaoui, H., & Ghouma, H. (2020). Sukuk market development and Islamic banks' capital ratios. *Research in International Business and Finance*, 51, 101064.
- Warsame, M. H. and Ireri, E. M. (2016). Does the theory of planned behaviour (TPB) matter in sukuk investment decisions?, *Journal of Behavioral and Experimental Finance*, Vol. 12 No. 1, pp. 93-100.
- Zaid, Z. (2019). Attitudes towards Islamic Banks: The Impact of Religiosity and the Moderating Role of Trust. *International Journal of Accounting & Finance Review*, 4(2), 29-36.

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