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Verify Halal Certification Using Mobile Applications: Intention to Use Among Malaysian Muslim Consumers

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Abstract

As the issues of misuse and false halal certificates have been raised recently, the authenticity of the halal certificate labelled on the products has been a primary concern among consumers, especially for Muslim consumers to meet their religious requirements. Therefore, in line with the advancements in mobile technology, numerous verification applications have been developed, which could make validating the authenticity of these halal certificates more convenient. However, very few studies have been exclusively focused on the adoption of these mobile applications. With that, this study investigates the factors that significantly affect the intention to use (IU) mobile applications in verifying the halal certificate among Malaysian Muslim consumers. A research framework based on the theory of planned behaviour (TPB) is developed by incorporating three additional factors, namely halal knowledge (HAK), halal awareness (HAA), and religiosity (RE). The partial least squares-structural equation modelling (PLS-SEM) has been used to analyse the 206 collected responses through purposive sampling. The study's result first showed that, except for subjective norms, all factors played a crucial role in determining consumers' IU, directly based on consumers' attitudes (AT) or indirectly through AT. Specifically, AT and perceived behavioural control (PBC) significantly influenced IU, while HAK, HAA, and RE significantly affected consumers' AT. Additionally, IU is indirectly affected by HAK and HAA through AT. The study's findings provided essential theoretical and practical implications and could benefit the literature and stakeholders by helping them better understand the subject matter.

Keywords: Halal Verification Applications, Intention to Use, Halal Knowledge, Halal Awareness, Religiosity

Introduction

Recently, the issues of misuse and false halal certificates and logos have been reported in numerous newspapers. For example, Dermawan (2022) reported that the Ministry of Domestic Trade and Consumer Affairs enforcement team seized several food products due to allegedly misusing the halal logo in Penang. The relevant authorities have again noticed the misuse of the Halal logo in Negeri Sembilan for honey products (Hasbi, 2023). Besides, Bernama (2023) also reported that the Ministry of Domestic Trade and Cost of Living also seized some products without a certified Halal logo in Perak. Similar cases were also reported in Pahang, where the enforcement officers and the authorities again detected that convenience stores sell uncertified imported foods

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(SinarDaily, 2023). Moreover, some products still using expired halal certificates have also been detected and caught by the relevant authorities (Kaur, 2024; Solehim, 2024). These issues have undermined consumers' confidence in the validity of the halal certificate labelled on the products. Therefore, verifying the authenticity of the halal certificate labelled on the products or displayed on the premises became an essential step for Muslim consumers to ensure they are consuming the products certified Halal by the authorities.

In line with technological advancements, numerous verification platforms have been introduced to ease the verification processes for the authenticity of halal certificates. For instance, verification through a Short Messaging System (SMS) and website checking have been introduced. Likewise, several mobile verification applications have also been developed for consumers to check the legitimacy of the halal certificate just by scanning the product's barcode. Nowadays, consumers can download these applications from application stores such as App Store and Google Play without any costs, and they can use them to verify the halal certificate more conveniently and quickly. The former Minister of Religious Affairs, Datuk Seri Dr. Zulkifli Mohamad Al-Bakri, also advised the public to utilise these applications to check the halal status of the products (Manzor, 2020). It is projected that Muslim consumers will widely adopt these mobile applications to validate the status of the halal certificates and avoid any unfortunate issues inconsistent with the Shariah principles. Unfortunately, as acknowledged by the former Deputy Minister in the Prime Minister's Office, Fuziah Salleh, the mobile halal verification applications have not been widely adopted since their introduction in the year 2017 and the possible reason might be the public may not know the existence of these platforms (Zainudin, 2019). Therefore, it is required to further study on the adoption of mobile halal verification applications.

Empirically, minimal studies focused on the factors affecting consumers' or users' intention to use (IU) mobile halal verification applications. Previous studies mainly concentrated on other mobile applications such as mobile payment, mobile shopping, mobile banking, mobile investment, and the like (e.g. Ng, Yap, Tan, Lo, & Ooi, 2022; Lew, Tan, Loh, Hew, & Ooi, 2021; Ling, Lee, Ling, & Mohd Suhaimi, 2024a; Yan, Tan, Loh, Hew, & Ooi, 2021). However, mobile halal verification applications are not the same as those of other applications. Therefore, the findings of these empirical studies may not be generalisable appropriately to the halal verification application. Moreover, the significant influence of halal knowledge (HAK), halal awareness (HAA) and religiosity (RE) toward the halal related studies (such as halal products) have been proven in the literature (e.g., Handriana, Yulianti, Kurniawati, Arina, Aisyah, Aryani, & Wandira, 2021; Irfany, Khairunnisa, & Tieman, 2024; Nurhayati & Hendar, 2020; Widyanto & Sitohang, 2022). Unfortunately, the effect of these factors (HAK, HAA, and RE) on consumers' IU mobile applications, especially halal verification applications, is also deficient. With that, there is a need to study the factors that determine Muslim consumers' use of these verification applications in verifying the halal certificate by considering the role of HAK, HAA, and RE.

This study investigates factors significantly affecting Muslim consumers' IU mobile applications to verify halal certificates. Based on the Theory of Planned Behaviour (TPB), three additional factors (HAK, HAA, and RE) have been added to the proposed research framework to capture the unique study contexts on halal certificates. With that, the study suggested that three factors of TPB may directly affect consumers' IU, while the additional factors could indirectly affect consumers' IU through a mediator of attitudes (AT). By exploring the matter, the study's findings could be helpful theoretically and practically. For instance, new evidence on the adoption

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of mobile halal verification applications and the effect of the three additional factors on their adoption are provided. Moreover, the findings also benefit stakeholders by increasing the usage of these applications in verifying the halal certificates to prevent any unfortunate events due to the misuse or false halal certificates.

Literature Review and Hypotheses Development

Theory of Planned Behaviour

TPB is a framework introduced by Ajzen (1985) to predict human behaviour using three predictors: AT, subjective norms (SN), and perceived behavioural control (PBC). With the superiority of the predictability of this framework, it has been widely used in numerous studies, especially those related to human behaviour. However, the main limitation of the TPB framework is it was introduced for general behaviour, and therefore, it does not capture the specific characteristics of the particular behaviour. With that, some empirical studies have extended this framework to better explain the subject matter by adding particular factors related to the subject matter. For instance, Ling, Chin, Yi, and Wong (2023) extended TPB with environmental knowledge, social media influence, and government support as a moderator in studying college students' green consumption behaviour. Besides, Kasri, Ahsan, Widiatmoko, and Hati (2023) added RE and knowledge of halal products in the TPB model in their study on halal pharmaceutical products. Similarly, Mustapha, Mohammad, Quoquab, and Salam (2023) extended the TPB model with knowledge in investigating the intention of Islamic banking adoption. Therefore, paralleled with these empirical studies, this study also adopted the TPB model as the foundation of the study. It extended it with three additional factors: HAK, awareness, and RE.

Effect of TPB Factors on IU

AT refers to a person's feelings toward an object or behaviour (Ajzen, 1991). Generally, individuals could have positive or negative feelings about a particular object or behaviour, further influencing their behavioural intention. Consistent with most of the evidence in the literature, AT is perceived to affect the IU positively. For example, Kasri et al. (2023) found that AT significantly affected consumer's purchase intention toward halal pharmaceutical products. A similar positive significant influence of AT toward the intention to adopt Islamic banking services was also revealed by Mustapha et al. (2023). In a recent study on Islamic apparel, Zaki and Elseidi (2024) found that AT significantly affects purchase intention.

SN is the pressure from other persons in the social context that may influence an individual's behaviour (Ajzen, 1991). The individual's behaviour is likely to be affected by someone surrounding them, as the perception of these people may form pressure for them to follow. Therefore, the significant effect of SN on behavioural intention is also broadly acknowledged in the literature. For instance, Widyanto and Sitohang (2022) showed that SN is significant with the purchase intention toward halal-certified cosmetics and pharmaceutical products. Raza, Ahmed, Ali, and Qureshi (2020) also revealed the significant role of the SN in Islamic insurance adoption. Mustapha et al. (2023) also further proved SN's positively significant role in adopting Islamic banking services.

Ajzen (1991) defined PBC as the difficulty level in performing a particular behaviour. Besides, it also refers to any additional cost or effort required when engaging in that behaviour.

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Theoretically, consumers tend to have a high behavioural intention if they perceive that adopting that application is effortless and costless. The empirical evidence supports this postulation. For example, Kasri et al. (2023) found that consumers have a high intention to buy halal pharmaceutical products if they perceive that consuming them is easy. Similarly, Raza et al. (2020) also found that consumers' PBC significantly affects their intention to adopt Islamic insurance. Again, Mustapha et al. (2023) also documented the significant effect of perceived behaviour control on the consumers' Islamic banking adoption. Therefore, the hypotheses below were proposed.

H1: AT is positive and significantly influenced on IU.
H2: SN is positive and significantly influenced on IU.
H3: PBC is positive and significantly influenced on IU.

Effect of HAK on AT

Nurcahyo and Hudrasyah (2017) defined HAK as the level of understanding an individual has toward the halal concept. It also refers to the expertise and skills attained by an individual regarding a particular object (Widyanto & Sitohang, 2022). Individuals are more likely to have favourable AT if they are more knowledgeable about halal. This proposition is proved in prior studies in different contexts. For example, Kasri et al. (2023) revealed that Muslims' AT is positively significantly affected by knowledge of halal products. Likewise, Sudarsono, Ikawati, Kurnia, Azizah, and Kholid (2024), and Widynato and Sitohang (2022) also found that HAK is significant in their AT toward studying halal vaccines and, cosmetics and pharmaceutical products, respectively. Hence, the hypothesis below is suggested.

H4: HAK is positive and significantly influenced on AT.

Effect of HAA on AT

Nurhayati and Hendar (2020) defined HAA as the individual's perception and cognitive reaction from their experience of consuming something such as foods, beverages, and other halal products. Besides, HAA also refers to the consumer's level of awareness of the issue related to halal products. Generally, individuals tend to have favourable AT toward the behaviour if they are more aware and conscious of the issues. As revealed by Handriana et al. (2021), the millennial generation's AT toward halal cosmetic products is significantly affected by HAA. Similarly, the positive effect of HAA on Muslim Generation Z's AT was also reported by Irfany et al. (2024) on environmentally friendly halal cosmetic products. Therefore, the following hypothesis was formulated.

H5: HAA is positive and significantly influences on AT.

Effect of RE on AT

Sulaiman, Iranmanesh, Foroughi, and Rosly (2022) defined RE as an individual's commitment to a particular religion. Besides, RE also refers to the likelihood of individuals toward the religious scriptures and teachings (Ngah, Tuan Mansor, Gabarre, Rahi, Khan, & Ahmad, 2023). Irfany et al. (2024) remarked that individuals tend to behave according to religious principles if they have high RE toward their religions. Therefore, Muslim consumers are postulated to have favourable

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AT toward the halal verification application if they have greater RE. This is supported by empirical evidence in different contexts. For instance, Zaki and Elseidi (2024) found that RE positively influences AT. Similarly, Amalia, Sosianika, and Suhartanto (2020) also found a significant effect of RE on the consumer's AT toward Halal food. The significant positive impact of RE on Muslim AT has also been documented by Irfany et al. (2024). Thus, the hypotheses below are proposed.

H6: RE is positive and significantly influenced on AT.

Mediating Effect of AT

This study also proposed that the three additional factors (HAK, HAA, and RE) indirectly affect the IU through AT. Farani, Karimi, and Motaghed (2017) remarked that some exogenous factors might affect the endogenous factors through TPB factors. This proposition also aligns with some studies that proved the significant mediating effect of AT between the exogenous and endogenous factors. For example, Bajat, Mohmed@Wasli, Ling, and Lee (2024) showed that electronic word of mouth (eWOM) indirectly affects functional food purchase intention through AT. Similarly, Ling, Ling, and Wasali (2024b) also revealed the significant mediating role of AT between environmental responsibility and consciousness toward investment intention. Moreover, Widyanto and Sitohang (2022) also further remarked on the mediating role of AT in the association between HAK, RE, halal certificate, and SN on halal-certified cosmetics and pharmaceutical products' purchase intention. The indirect effect of knowledge on the behavioural intention to adopt Islamic banking services is also further revealed in the study by Mustapha et al. (2023). Therefore, the following indirect hypotheses through AT are also formulated.

H7: HAK and IU are significantly mediated by AT.
H8: HAA and IU are significantly mediated by AT.
H9: RE and IU are significantly mediated by AT.

For the above discussion, the study's proposed research framework is presented in Figure 1.

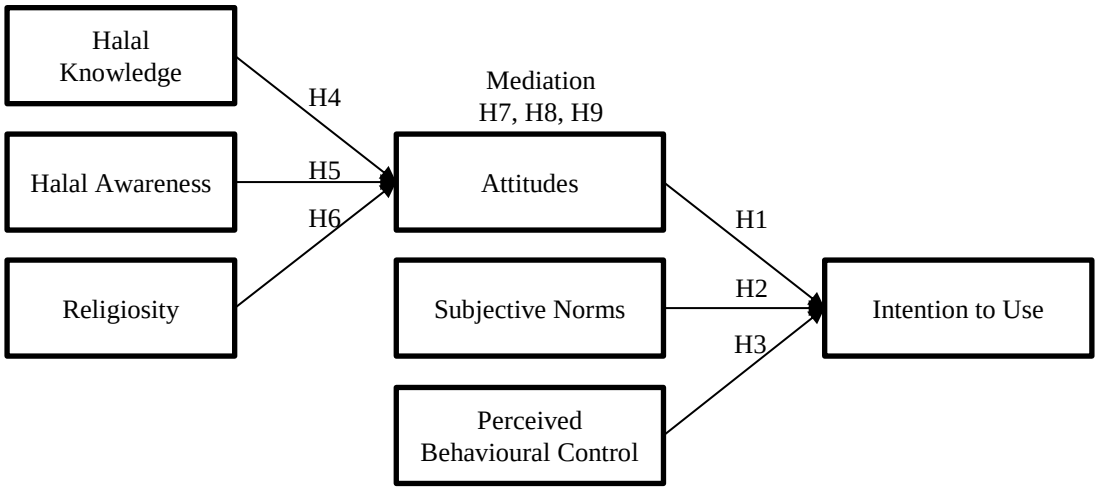

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Figure 1: Proposed Research Framework
Sources: Own developed

Methodology

This study used purposive sampling to collect the quantitative primary data from the targeted population, Muslim consumers. In this study, only Muslim consumers in Malaysia are allowed to participate, as the study's objective is to investigate the subject matter from the perspective of Muslim consumers. Therefore, two screening questions have been used to ensure the eligibility of the respondents. By using the online questionnaire through Google Forms, a total of 206 usable samples were gathered. This number of samples is sufficient for the study as it is greater than the minimum sample size (119) determined by the power analysis with the criteria of medium effect size, power level of 0.95 and three predictors (Memon, Ting, Cheah, Thurasamy, Chuah, & Cham, 2020).

Thirty-one validated items from the previous studies were adapted to develop the study's questionnaire. These studies included Ayyub, Xuhui, Asif, and Ayyub (2020), Lew et al. (2021), Loussaief, Lin, Dang, Bouslama, and Cheng (2023), Rostiani, Firdausi, Arini, Mulyani, and Sunarharum, (2023), Sulaiman et al. (2022), Verma, Chaurasia, and Bhattacharyya (2020), and Widyanto and Sitohang (2022). When responding, the respondents are required to evaluate the measurement items using the seven-point Likert scale to measure the level of agreement and disagreement toward these measurement items.

Additionally, due to a large number of respondents aged 30-year-old and below, the study has included age as a control variable to ensure no respondent bias might confound the study's result. The result for this control variable is provided in Table 4 and shows that age has no significant influence on the IU.

The collected responses were first assessed using Mardia's multivariate skewness and kurtosis to evaluate the normality of the data. The result showed that the skewness coefficient (25.5999) and kurtosis coefficient (104.1217) of the collected data are higher than the value of 20, and this signified that the collected responses are not normality distributed (Kline, 2011). Hair, Risher, Sarstedt, and Ringle (2019) suggested that partial least square-structural equation modelling (PLS-SEM) is a suitable analysis technique for data that is not normally distributed. Thus, the PLS-SEM in SmartPLS version 4 was used as the statistical analysis technique of the study.

Data Analysis and Findings

Respondents' Characteristic Profiles

The characteristic profiles of the respondents are provided in Table 1. Generally, the study's respondents were dominated by female respondents, accounting for 75% compared to 25% of male respondents. Around 59% of respondents were 30 and below, followed by 31 to 40. Most of the respondents (62%) were employees, followed by students (14%) and self-employed (11%). Regarding the highest education, 77% of respondents received tertiary education, while the remaining graduated with postgraduate degrees and primary and secondary schools.

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Table 1: Respondents' Characteristic Profiles

Characteristics	Groups	Frequency	Percentage
Gender	Male	52	25.24
	Female	154	74.76
Age Range	30 YO and below	122	59.22
	31 – 40 YO	39	18.93
	41 – 50 YO	17	8.25
	51 YO and above	28	13.59
Occupation	Employee	127	61.65
	Self-Employed	22	10.68
	Students	29	14.08
	Housewife / Househusband	17	8.25
	Retirees	11	5.34
Highest Education	Postgraduate Degrees	23	11.17
	Tertiary Degrees	159	77.18
	Compulsory Education	24	11.65

Source: Authors (2024)

Common Method Bias

The study employed Harman's single factor analysis and full collinearity method in assessing the common method bias (CMB), and the results of both tests consistently showed that CMB does not appear in this study. Specifically, Harman's single factor test showed that all validated items only explained approximately 47.1840% of the variance in a single factor, and this is lower than the level of 50% (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). As provided in Table 2, all factors' variance inflation factors (VIF) values were also less than 5. This further indicated that the CMB does not exist in this study (Hair, Hult, Ringle, & Sarstedt, 2017).

Outer Model Assessment

Tables 2 and 3 presented the results of the outer model assessment consisting of convergent validity, reliability, and discriminant validity of the collected responses. The results first showed that the convergent validity of the study was achieved at factor and items level. For instance, except for HAA5, HAK 1, HAK5, and RE5, all items have a loading value exceeding 0.7080 (Hair et al., 2017). Likewise, all factors have an average variance extracted (AVE) value greater than 0.5000 (Bagozzi & Yi, 1988), which confirmed the study's validity. Besides, the composite reliability (CR) value for all factors is higher than the level of 0.7000, which further signified the high internal consistency of the collected data (Hair et al., 2017). Moreover, the discriminant validity was examined using the heterotrait-monotrait (HTMT) ratio of correlation, and the result is provided in Table 3. The result of HTMT showed that the discriminant validity of the study was also attained as the values were not greater than 0.8500 level (Kline, 2011).

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Table 2: Results of Outer Model Assessment

Factors	Items	Loading	AVE	CR	VIF
Attitudes	AT1	0.9312	0.8598	0.9608	3.4060
	AT2	0.9461			
	AT3	0.9285			
	AT4	0.9028			
Subjective Norms	SN1	0.9196	0.8489	0.9440	2.3760
	SN2	0.9284			
	SN3	0.9159			
Perceived Behavioural Control	PBC1	0.8585	0.7811	0.9345	3.1760
	PBC2	0.9092			
	PBC3	0.8621			
	PBC4	0.9042			
Halal Knowledge	HAK2	0.7788	0.6578	0.8520	2.0960
	HAK3	0.7945			
	HAK4	0.8576			
Halal Awareness	HAA1	0.8863	0.7609	0.9272	2.5570
	HAA2	0.8710			
	HAA3	0.8532			
	HAA4	0.8785			
Religiosity	RE1	0.7663	0.6403	0.8764	1.7560
	RE2	0.7441			
	RE3	0.8705			
	RE4	0.8139			
Intention to Use	IU1	0.8828	0.7928	0.9501	2.1770
	IU2	0.9286			
	IU3	0.9233			
	IU4	0.9361			
	IU5	0.7705			

Source: Authors (2024)

Table 3: Result of Discriminant Validity through HTMT

	ATT	SN	PBC	HAK	HAA	RE	IU
ATT							
SN	0.6994						
PBC	0.7741	0.7970					
HAK	0.7789	0.6194	0.6774				
HAA	0.7379	0.4902	0.5597	0.7962			
RE	0.6208	0.3935	0.5033	0.5952	0.7317		
IU	0.6978	0.6153	0.7455	0.5976	0.5090	0.4878	

Source: Authors (2024)

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Inner Model Assessment

The study continued with the inner model assessment, and the results of the hypotheses testing were provided in Table 4 and Figure 2. Overall, all proposed hypotheses were supported except for H2. The IU was significantly impacted by AT (β = 0.3188) and PBC (β = 0.4174). Therefore, H1 and H3 are supported. However, H2 is not supported as the result showed that SN (β = 0.0622) is insignificant with IU. Besides, the three additional factors, HAK (β = 0.3484), HAA (β = 0.3512), and RE (β = 0.1645), also significantly influenced AT, thus supporting H4, H5, and H6. For the indirect hypotheses, the result revealed that two out of three additional factors also indirectly influenced IU through AT, except for RE. Specifically, HAK indirectly affected IU via AT (β = 0.1111), and this supported H7. H8 is also supported as HAA indirectly affects IU through AT (β = 0.1119). However, RE has insignificantly indirectly influenced IU through AT (β = 0.0524). These results showed that the HAK and HAA directly influenced ATT and indirectly affected IU through AT.

Moreover, the R-squared (R^2) values showed that three additional factors predicted 55.65% of the variation in ATT. Similarly, the R^2 value for IU also implied that the three TPB factors explained 53.53% of the variance of IU. Additionally, the predictive relevance (Q^2) values for AT and IU (0.4723 and 0.4079) proved the predictive ability of the exogenous variables. The effect size (f^2) result in Table 4 also showed that AT and PBC have a small effect on IU, while SN has no effect on IU (Cohen, 1988). However, HAA and RE have a small effect size on AT, while HAK showed a medium effect size on AT. For mediating results, HAK and HAA have a small indirect effect on IU via AT, while RE has no indirect effect on IU as the f^2 is lower than 0.01 (Cohen, 1988).

Table 4: Results of Inner Model Assessments for Hypotheses Testing

Hypo.	Path	Coeff.	Std. Dev.	T-value	P-value	f^2	Remark
H1	AT -> IU	0.3188	0.0735	4.3368	0.0000	0.0980	Supported
H2	SN -> IU	0.0622	0.0592	1.0506	0.1467	0.0036	Not Supported
H3	PBC -> IU	0.4174	0.0808	5.1639	0.0000	0.1351	Supported
H4	HAK -> AT	0.3484	0.0773	4.5080	0.0000	0.1568	Supported
H5	HAA -> AT	0.3512	0.0787	4.4610	0.0000	0.1226	Supported
H6	RE -> AT	0.1645	0.0728	2.2591	0.0120	0.0366	Supported
H7	HAK -> AT -> IU	0.1111	0.0367	3.0252	0.0025	0.0123	Supported
H8	HAA -> AT -> IU	0.1119	0.0350	3.1957	0.0014	0.0125	Supported
H9	RE -> AT -> IU	0.0524	0.0269	1.9455	0.0518	0.0027	Not Supported
Control Variable							
	Age	-0.0353	0.1067	0.3304	0.3706		Not Significant

Source: Authors (2024)

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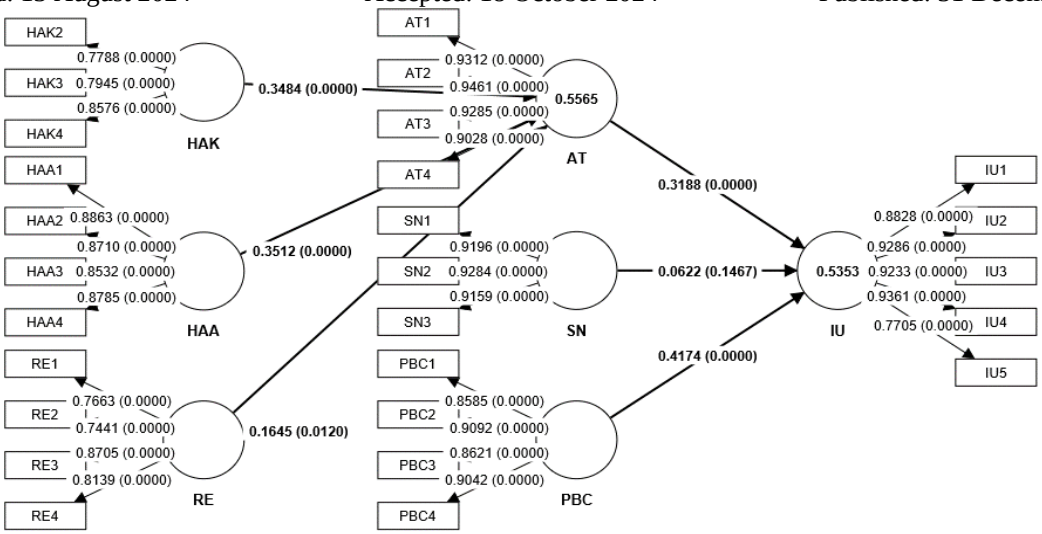

Figure 2: Results of Inner Model Assessments for Hypotheses Testing
Source: SmartPLS

Discussion

The study extended the TPB model with three additional factors (HAK, HAA, and RE) in investigating Malaysian Muslim consumers using halal verification applications. The result first showed that consumers' IU is positively significantly affected by their AT, and this is in line with Kasri et al. (2023), Mustapha et al. (2023), and Zaki and Elseidi (2024), who also remarked the significant effect of AT on behavioural intention. This signified that consumers tend to use these applications if they have favourable AT toward them. Besides, the study also found a positive and significant influence of PBC on consumers' IU. This significant finding is paralleled with Kasri et al. (2023), Mustapha et al. (2023), and Raza et al. (2020), who also proved the behavioural intention could be cultivated if consumers perceived it is easy to use and required no additional costs. However, opposing Mustapha et al. (2023), Raza et al. (2020), and Widyanto and Sitohang (2022), the study further revealed the insignificant role of SN toward the IU. This finding is quite surprising as the literature dominates the significant role. However, the possible reason for this insignificant role of SN toward behavioural intention could be due to the context of the different studies, as Muslim consumers tend to have high self-discipline in verifying the halal certificate when purchasing halal products. Therefore, the influence of the people surrounding them could have less impact on their adoption behaviour.

Consistent with Kasri et al. (2023), Sudarsono et al. (2024), and Widynato and Sitohang (2022), the significant effect of HAK on consumers' AT was also revealed in the study. This indicated that consumers' favourable AT toward the applications could be fostered if they are highly knowledgeable about halal products and issues. Besides, the finding also showed that high awareness of the halal concept could further nurture favourable AT, which is agreed with Handriana et al. (2021) and Irfany et al. (2024). Besides, consumers' RE was also found to have a positive significant influence on their AT, and this further supported the findings of Amalia et al. (2020), Irfany et al. (2024), and Zaki and Elseidi (2024). These findings proved that the higher the

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consumers' knowledge and awareness of halal issues and RE regarding their religions, the more Muslim consumers are likely to have favourable AT toward the applications. The study also revealed the indirect influence of HAK and HAA on the IU. These findings are paralleled with Bajat et al. (2024), Ling et al. (2024b), Mustapha et al. (2023), and Widyanto and Sitohang (2022), who also found the significant mediating effect of AT on the relationship between exogenous and endogenous variables. With that, this study not only proved the significant direct effect of HAK, HAA, and RE on consumers' AT but also revealed the indirect effect of HAK and HAA on consumers' IU through AT.

Implications

Theoretically, the study findings offer important theoretical implications to the literature. Firstly, this study provided new insight into Muslim consumers' intention to adopt mobile applications to verify halal certificates. Compared to other mobile applications, halal verification applications are relatively limited being studied in the literature, and therefore, this study provides evidence on this matter. Besides, the applicability of the TPB model on consumers' behaviour is proven again in mobile applications-related studies. The study shows that AT and PBC still played a vital role in forming consumers' IU. Not only that, the study also extended the TPB model by incorporating three additional factors, namely HAK, HAA, and RE, to increase the predictability of the proposed framework. The extension of the TPB model provided another theoretical implication, as the results showed that all three additional factors are crucial in determining Muslim consumers' AT and IU. Therefore, further studies must extend the TPB model by including other specific factors that could capture the study context's features and improve the research framework's predictability.

Practically, the study's results also provided some essential implications for relevant stakeholders in increasing the usage of mobile halal verification applications. Stakeholders like the government and agencies such as the Ministry of Religion Affairs, Department of Islamic Development Malaysia (JAKIM), application operators, and others should keep emphasizing the five factors that significantly affect consumers' IU. For example, increasing consumers' knowledge and awareness of the halal concept and issues is crucial in establishing positive and favourable AT toward these verification applications. Stakeholders should widely disseminate related information and actively promote the advantages of verifying the halal certificate using mobile applications, as these efforts effectively cultivate consumers' AT toward the applications. Besides, increasing Muslim consumers' RE toward Islam is also vital, as consumers tend to have favourable AT if they are highly attached to their religion. Not only promoting favourable AT, but all of the related efforts and strategies that could improve Muslim consumers' understanding and consciousness toward Halal products and issues would also indirectly foster their IU these verifying applications if they have positive AT. Thus, it is necessary to focus on the three additional factors if the stakeholders wish to increase the adoption of the verifying application.

Furthermore, both AT and PBC are found to affect Muslim consumers' IU directly. Therefore, stakeholders must also enhance consumers' AT toward these applications and increase their usage. As explained, increasing consumers' knowledge and awareness of halal issues and RE toward Islam is essential to promoting their favourable AT toward these verifying applications. Likewise, application operators and providers also have to simplify the operation procedures of their applications as consumers are more likely to use their applications if it does not require

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additional effort or costs. Besides, adding more verifying information such as country of origin, ingredients, and others could be advantageous for consumers if they adopt these verifying applications to verify the authenticity of the halal certificate. These efforts and strategies are expected to increase Muslim consumers' IU mobile applications to verify the halal certificate.

Conclusions and Suggestions for Future Studies

With the lack of evidence regarding the adoption of mobile applications in verifying halal certificates, this study aimed to investigate the IU mobile applications in verifying halal certificates among Muslim consumers in Malaysia. The TPB model has been adopted as the foundation of the study and extended with three additional factors, namely HAK, HAA, and RE, to achieve the research objective. The study collected 206 usable responses from Malaysian Muslim consumers using a purposive sampling technique and further analysed using PLS-SEM. The results showed that all three additional factors positively affected consumers' AT, and AT and PBC significantly affected their IU. Besides, the findings showed that HAK and HAA significantly and indirectly influenced the IU through AT. These findings further provided some crucial theoretical and practical implications for understanding better the subject matter.

The study also presents several limitations that need to be considered by future studies to provide more solid and robust findings. For instance, the study primarily focuses on Muslim consumers in Malaysia, and this would limit the generalizability of findings as the findings are only helpful for similar research contexts and cannot be generalised to other contexts. Therefore, future studies should expand the geographical scope of the study by including more respondents from different geographical areas to enlarge the generalizability of the study. Besides, only three additional factors were considered in the study. However, many other factors the study ignores may significantly affect consumers' behavioural intentions. Future studies should incorporate factors such as government support, perceived credibility, perceived usefulness, and others to understand the subject matter better. Moreover, the perspective of non-Muslim consumers should be considered in future studies. This is because not only are Muslim consumers consuming halal products nowadays, but more and more non-Muslim consumers also accept Halal products due to the advantages and benefits of these products. Perhaps a comparison between Muslim and non-Muslim consumers could be one of the directions for future studies. Considering all the suggestions and addressing these limitations, the subject matter could be understood more thoroughly.

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