

Malaysia Halal Certification: A Review of Behavioural Intention in Adoption of Halal Auditing Mobile Apps

Nur Aaina Athira Hamdan^{1*}, Siti Suhana Jamaian¹

¹ Department of Mathematics and Statistics, Faculty Applied Sciences and Technology,
Universiti Tun Hussein Onn Malaysia, Pagoh Higher Education Hub, KM1, Jalan Panchor, 84600, MALAYSIA

*Corresponding Author: nuraainahamdan@gmail.com
DOI: <https://doi.org/10.30880/jastec.2024.01.02.005>

Article Info

Received: 24 October 2024
Accepted: 4 December 2024
Available online: 11 December 2024

Keywords

UTUAT, halal auditing, mobile apps,
behavioral intention

Abstract

The increasing global demand for halal products has driven the need for more efficient and transparent halal certification processes, particularly in Malaysia. However, adopting digital tools, such as halal auditing mobile apps, remains underexplored. This study aims to examine the behavioral intention to adopt halal auditing mobile apps using the Unified Theory of Acceptance and Use of Technology (UTAUT) model, focusing on key factors such as performance expectancy, effort expectancy, social influence, and facilitating conditions and indirect factors such as anxiety, self-efficacy and attitude towards using technology. The study highlights that while mobile apps can significantly enhance efficiency and reduce errors in halal auditing, challenges exist in integrating religious and cultural aspects into the adoption process. The findings underscore the need for more specific research on the regulatory and operational needs of halal certification in Malaysia. These insights can guide future research and help practitioners implement digital innovations in halal auditing.

1. Introduction

The halal industry represents a significant and diverse market, with its primary aim to ensure that products comply with Islamic law through rigorous verification and certification processes (Mohd Sulaiman et al., 2018). However, obtaining or renewing Halal Certification (HC) remains complex and time-consuming, often involving extensive documentation and strict compliance with guidelines set by the Islamic Council (Petiwalla et al., 2021). As technology evolves, the HC process must also adapt to streamline its operations (Mohd Sulaiman et al., 2018). In Malaysia, the Department of Islamic Development Malaysia (JAKIM) oversees HC, requiring companies to meet stringent auditing standards (Fadzil, 2022). Auditors face challenges such as ensuring compliance with documentation, equipment standards, hygiene, and labeling requirements (MPPHM, 2020). Recent studies, including Farid et al. (2023) and Noor et al. (2022), emphasize the increasing complexity of HC due to globalization and the need for more advanced digital solutions to meet international halal standards.

One of the primary issues in HC management is the lengthy application process (Muhammad et al., 2020), further complicated by incomplete documentation submitted via platforms like MyeHalal (Arif et al., 2019). The preparation phase, particularly the development of a checklist, is crucial for ensuring a smooth audit process (Amin, 2021). Creating comprehensive checklists requires auditors to align multiple standards, including the Malaysian Halal Management System (MHMS), Manual Prosedur Pensijilan Halal Malaysia (MPPHM), and Malaysian Standards (Irfan & Iskandar, 2017). Without a well-structured checklist, there is an increased risk of application rejection by JAKIM or JAIN, resulting in additional costs and resource demands (Muhammad et al., 2020). Despite these challenges, there has been limited research addressing how digital technologies can aid in checklist preparation and reduce these inefficiencies.

This is an open access article under the CC BY-NC-SA 4.0 license.



The current halal audit process also heavily relies on manual, paper-based systems, which are time-consuming and prone to errors (Fadzil, 2022). Recent studies, such as Zaki and Hassan (2021), highlight the potential of digital tools like QuikHalal, a cloud-based mobile app, to enhance the efficiency, transparency, and accuracy of halal audits by streamlining planning, execution, and reporting processes. However, Widiani and Abdullah (2018) and more recent works (e.g., Salim et al., 2023) show that the halal industry has been slow to adopt such technologies, particularly in the HC process. The adoption of digital solutions remains underexplored, especially in understanding the barriers to adoption within the unique regulatory and cultural context of the halal industry.

However, the adoption of technology in the halal sector is influenced by the cultural and religious sensitivities of Muslim consumers, who are increasingly concerned about the compliance of processed foods with their religious requirements (Man & Sazili, 2010). Producers and retailers in the halal sector must navigate these sensitivities to ensure their products and services meet the expectations of their Muslim customers, who are becoming more discerning and aware of the importance of halal certification (Lim et al., 2020). The growing awareness and demand for halal-certified products have also led to an increase in the number of halal certification bodies globally. This trend is expected to continue as the Muslim population and their purchasing power continue to grow. (Muhamed et al., 2019) (Lim et al., 2020). To cater to the cultural and religious sensitivities of Muslim consumers, the halal sector has had to adopt various technologies to ensure the integrity and traceability of their products.

Technology adoption largely depends on user acceptance (Davis, 1989). While the Technology Acceptance Model (TAM) has been widely used to measure adoption, it has limitations in addressing user perceptions of new systems (Šumak et al., 2017; Tsai et al., 2018). The Unified Theory of Acceptance and Use of Technology (UTAUT) offers a more comprehensive framework, addressing TAM's gaps and providing a robust basis for examining behavioral intention. Recent studies, such as Rahman et al. (2022) and Abdullah et al. (2024), have successfully applied the UTAUT framework to investigate technology adoption in diverse industries, including education, healthcare, and e-commerce, highlighting its versatility in understanding user behavior across different sectors, but its application in the halal industry remains limited. This study aims to address this gap by identifying factors influencing halal auditors' intention to adopt mobile auditing apps like QuikHalal and proposing a UTAUT-based adoption model tailored to the halal industry.

2. Halal Certification in Malaysia

With a population of 28 million, Malaysia has one of the largest economies in East Asia, where 60% of the population is Muslim (Kamaruddin et al., 2012). The need for Halal Certification (HC) has grown as businesses across various sectors thrive. Halal certification in Malaysia began in 1974 with the involvement of JAKIM to ensure products met Islamic dietary requirements. Over the years, the certification process evolved, with JAKIM officially managing domestic and international halal certification since 2009. HC plays a critical role in ensuring that products comply with Islamic law and instills confidence in Muslim consumers regarding the safety, quality, and integrity of products they use daily. Moreover, HC is internationally recognized, regularly updated by JAKIM, and is a mark of health, quality, and environmental standards (Rokshana, 2016).

HC is seen as a new driver of economic growth, especially in industries like food and hospitality, attracting Middle Eastern tourists and investments (HDC, 2011). Malaysia has consistently ranked among the top five nations dominating the global halal market (Mat et al., 2020). Although certifications like Good Manufacturing Practice (GMP), Hazard Analysis Critical Control Point (HACCP), and others are helpful, they do not meet the specific religious requirements for Muslims (Mohd Sulaiman et al., 2018). HC ensures that products meet both safety standards and Islamic principles. While HC is voluntary in Malaysia, it is increasingly viewed as essential for businesses aiming to cater to Muslim consumers, said Mohamad Nordin Ibrahim, the director-general of JAKIM (The Malaysian Insight, 2019).

Malaysia's government, through JAKIM, manages halal certification, unlike other nations where Islamic groups handle this process (Adam, 2006). The latest standard operating procedure, the Manual Procedure for Malaysia Halal Certification 2020 (MPPHM 2020), outlines four main steps for obtaining Halal Certification: application, Halal Inspection (document approval and site inspection), approval by the Halal Certification Panel, and enforcement and monitoring (Noordin, 2013). Businesses apply for certification via the MyeHalal platform, which simplifies the process (Arif et al., 2019).

Applicants must create and verify a MyeHalal account, submit the required documents to the Islamic Religious Department Office, and pay the necessary fees. After document verification, auditors conduct a field audit of the premises. If any non-conformities are found, corrective actions must be taken before proceeding. Once all requirements are met, the Halal Certification Panel reviews the application, and if approved, the halal certificate is granted (Mohamad & Othman, 2009). The process flow is shown in Fig 1.

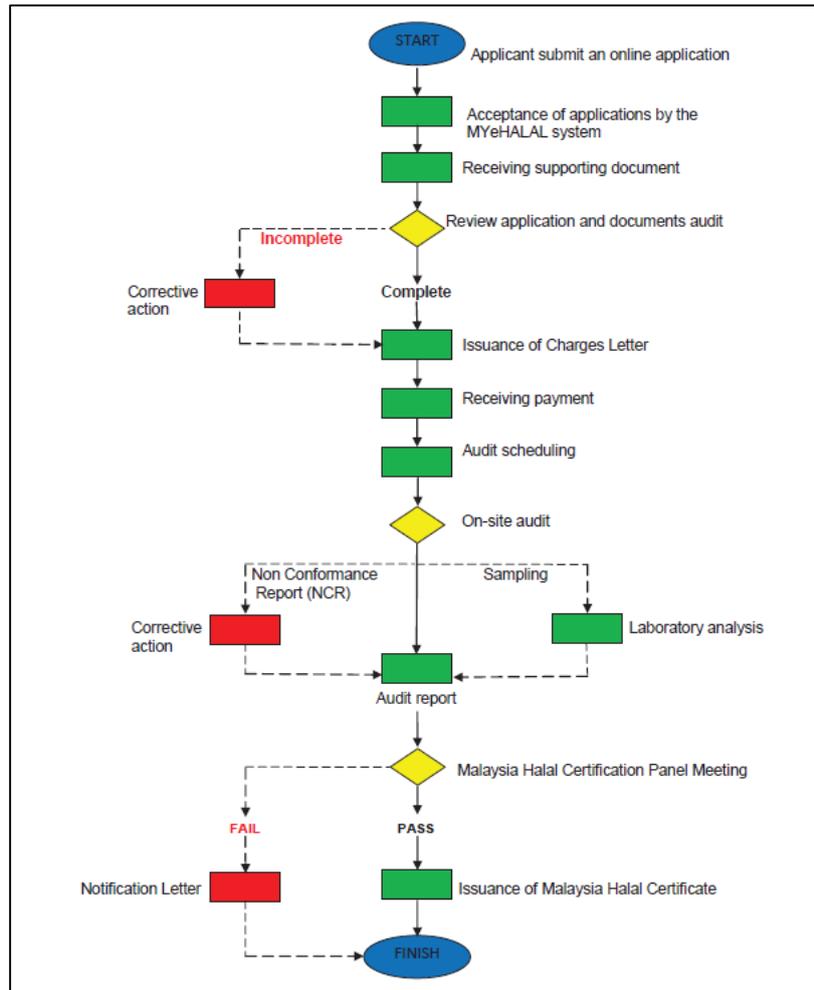


Fig. 1 Malaysia halal certification process flow chart (MPPHM, 2014)

2.1 Halal Audit

As defined by ISO 9000:2000, a halal audit is a systematic, independent, and documented process designed to assess compliance with audit criteria. It involves on-site inspections to evaluate whether businesses meet the requirements for halal certification (Maidhili & Nithyanandam, 2017; Mohamad & Othman, 2009). Audits are conducted by qualified individuals and serve as a crucial step in verifying halal compliance, providing assurance to consumers (Fadzil, 2022). Halal auditors are categorized into internal and external auditors (Rahman et al., 2020). Internal auditors, known as first-party auditors, monitor the company's operations, while external auditors, including Technical and Shariah auditors from JAKIM and JAIN, review halal documents and inspect premises to ensure compliance with halal standards and prevent contamination.

2.2 Type of Audit

According to the Manual Prosedur Pensijilan Halal Malaysia (2020), there are three types of halal audits: adequacy, field, and follow-up. An adequacy audit involves reviewing and evaluating documents such as business details, employee information, ingredient lists, and the Halal Assurance System (HAS) manual to ensure compliance. If any documents are incomplete, the auditor can reject the application but must provide a checklist report to inform the applicant of the necessary corrections (Fadzil, 2022; Amin, 2021).

A field audit, or on-site audit, takes place after the adequacy audit is approved and involves inspecting the production process, storage, and other relevant areas to ensure halal compliance. This audit includes technical and Shariah components, and any non-conformance issues (NCR) must be addressed within 14 days (Jais, 2016). A follow-up audit is conducted after this period to ensure the corrective actions have been implemented. If non-compliance persists after the follow-up audit, the application is rejected and must be resubmitted (JAKIM, 2020).

3. Adoption Theories of Technology

Many theories can be used to design research instruments for adopting technology. Educational technology experts have presented many theoretical views to increase knowledge of how end users make decisions to use specific technologies. New technology adoption must have a targeted population to utilize the benefits of the technology. Therefore, models and theories are ascertained with the innovation of service suggested, mainly used to analyze the success or failure of technological applications. According to Husny (2016), there are three main models with regard to the theories of adoption of technology which researchers have widely used. They are the Technology-Organization-Environment (TOE), second is framework Technological Frames of Reference (TFR), and third is institutional theory Technology of Acceptance (TAM), Diffusion of Innovation (DOI) Theory and Unified Theory of Acceptance and Use of Technology (UTAUT).

3.1 Technology-Organization-Environment

Tornatzky and Fleischer (1990) introduced the Technology-Organization-Environment (TOE) framework to examine the organizational adoption of new technology. This theoretical framework investigates how three variables; technology, organization, and environment, affect a company's choice to adopt a new technology. The impact of the company's internal and external technologies is described in the technological component, and it also explains how implementing new technologies might affect a company. The decision to adopt has been significantly influenced by the organizational context related to several organizational measurements, including firm size, scope, and the complexity of the organizational management structure. Lastly, the environmental setting describes the area where an organization conducts business, including the sector, rivals, and governmental regulations.

3.2 Technological Frames of Reference

Orlikowski (1994) first suggested technical Frames of References (TFR). It examines methods to reduce organizational member incongruity using modern technologies. According to this theory, the form of technology, technical approach, and technology in use all significantly affect how dependent members are on the new technology, which in turn improves efficacy. Understands that different groups have diverse views on the value and relevance of technological artefacts and that these lenses or points of view play a crucial role in how organizations perceive noncompliance. TFR constructions, on the other hand, connect to expectations and collective understanding of technology among organizational members as well as to technology.

3.3 Technology of Acceptance

The technology acceptance model (TAM), introduced by Davis in 1986, is one of the most well-known models pertaining to technology adoption and utilization. TAM is a theoretical model for explaining and predicting information technology user behavior (Legris et al., 2003). TAM is considered the best model for increasing understanding of users' acceptance (Park, 2009; Bourgonjon et al., 2010) and predicting users' behavior towards information technology use (Legris et al., 2003).

3.4 Diffusion of Innovation

Rogers (1995) created the Diffusion of Innovation (DOI) Theory. The DOI model is frequently used to describe why and how individuals and organizations adopt new concepts and technologies. DOI describes how, why, and how quickly new innovations and ideas spread across cultures. According to Rogers (1995), the DOI hypothesis holds that innovation spreads through time and within a specific social system through a particular channel. Additionally, he claimed that people have varying degrees of desire to embrace innovations. Hence, it is typically seen that the population's share of adopters follows a roughly normal distribution over time.

3.5 Unified Theory of Acceptance and Use of Technology

The Unified Theory of Acceptance and Use of Technology (UTAUT) was proposed by Venkatesh et al., (2003) and seeks to explain why users use technology services and what happens when they decide to use them. When compared to previous models, the empirical study results showed that UTAUT is a better model of technological acceptance (Šumak and Šorgo, 2016). Eight models showed up to be significant direct predictors of intention or usage of technology and were reviewed and combined to create the UTAUT theory: TRA, TAM, Motivational Model, Theory of Planned Behavior (TPB), Combined TAM and the Theory of Planned Behavior (CTAMTPB), Motivational Model (MM), PC Usage Model (MPCU), DOI and Social Cognitive Theory (SCT). The anticipated possibility of adopting the technology is determined by the significant effect of four direct factors, namely performance expectancy (PE), effort expectancy (EE), social influence (S1), and facilitating condition (FC). While it is considered that anxiety (AX), self-efficacy (SE), and attitude towards using technology (ATUT) are not direct factors of intention. Apart from that, PE and EE were said to be direct indicator of BI (Venkatesh et al., 2003; Šumak and

Šorgo, 2016; Hoque and Sorwar, 2017; Khalilzadeh et al., 2017; Šumak, et al., 2017). According to UTAUT's theoretical framework, the actual usage of technology is determined by behavioral intention (BI). (Venkatesh et al., 2003).

Some of the research that successfully applied UTAUT for auditing area of study in usage of computer assisted audit techniques was Mustika et al., (2023) and Thottoli & Thomas, (2022) ERP software adoption in practicing auditors in audit firms. While Malik et al., (2017) adopt UTAUT method for determine factors influencing consumers' attitude towards adoption and continuous use of mobile applications in hedonic and utilitarian apps. In addition, Foon and Fah, (2011) implement the UTAUT method in internet banking adoption area. Wijaya et al., (2022), Al-Mamary, (2022) and Shaqrah & Almars, (2022) to the topic of digitalization of education.

3.5.1 Formulation of Model

The existing literature and theoretical models on technology adoption were studied to review the factors that encourage customer adoption of an app. The most similar research by Thottoli & Thomas, (2022) and Salsabila et al., (2022) also implements the direct factors only; PE, EE SI and FC only for their research. The conceptual of this research can be referring in Figure 2 where indirect factors will be included as there is lack of research that implements all the factors suggested by (Venkatesh et al., 2003). Strengthened by (Taylor and Todd, 1995) that included all the factors will provide a more comprehensive review of the research environment.

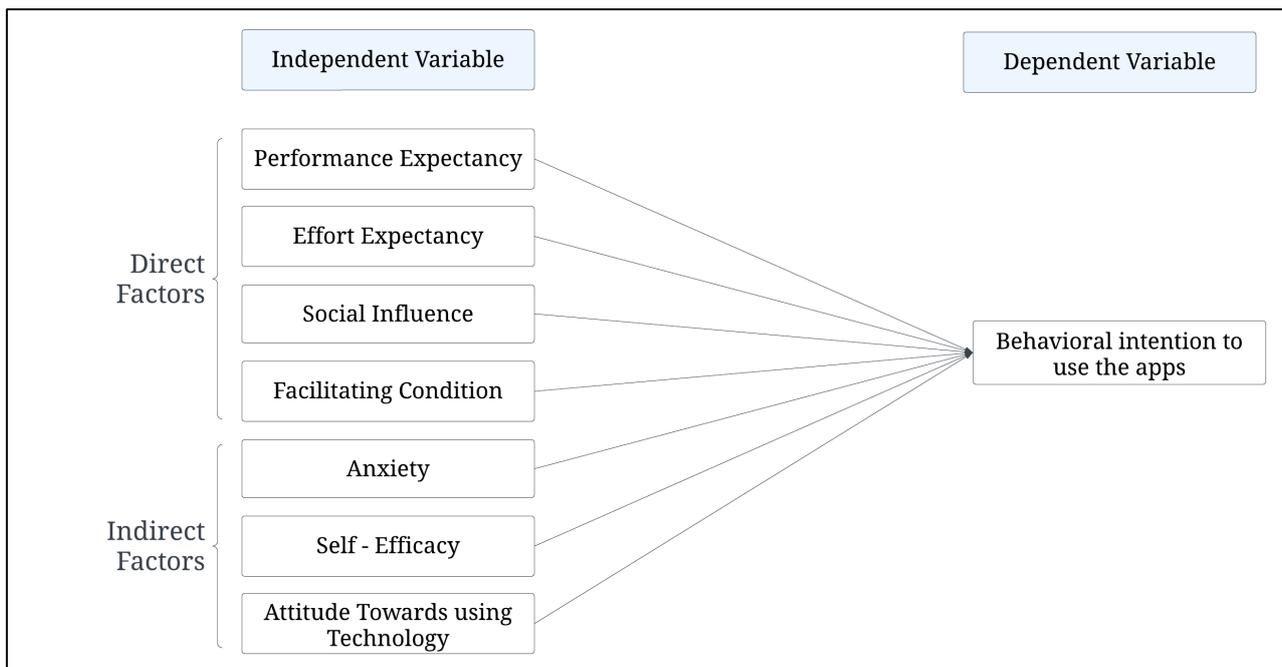


Fig. 2 Conceptual Model

Performance Expectancy

Performance expectancy (PE) is defined as “the degree to which an individual believes that using the system will help him or her attain gains in job performance” (Venkatesh et al., 2003). Performance expectancy is based on concepts from the TAM, TAM2, CTAMTPB, MM, MPCU, DOI and SCT (i.e., perceived usefulness, extrinsic motivation, job-fit, relative advantage, and outcome expectations). It is the most powerful predictor of intention to use and is important in both voluntary and mandatory settings (Zhou, Lu, & Wang, 2010; Venkatesh, Thong, & Xu, 2012). In the halal industry, studies have also utilized PE to explore technology acceptance. Hasan et al. (2022) investigated the adoption of blockchain technology in halal food supply chains, finding that PE significantly influenced user intention due to the perceived efficiency and reliability gains. Additionally, Ahmed et al. (2023) examined the use of mobile apps for halal food verification and reported that PE was a critical factor in driving adoption, especially when users recognized the potential improvement in job performance and task accuracy. Therefore, in this study, the researcher wants to determine if PE significantly influences the BI of halal auditors to adopt halal auditing apps.

Therefore, it is hypothesized that:

H1: Performance expectancy significantly influences the behavioral intention of halal auditors to adopt halal auditing apps.

Effort Expectancy

Effort expectancy (EE) or ease of use is defined as “the degree of ease associated with the use of the system”, (Venkatesh et al., 2003). Any technology is deemed to be useful if a consumer can easily use it or if the technology's operation requires little or no effort (Ghalandari, 2012). While Tang, (2016) add that when adopters find a mobile app that is less complicated and easier to use, they are more likely to utilize it. Teo and Noyes (2012) conducted a study of Singapore trainee teachers and discovered, using a Structural Equation Method technique, that EE strongly influences individual BI's usage of information technology. Additionally, Tan, Sim, Ooi, and Phusavat (2011) revealed that the BI's adoption of m-learning is highly influenced by perceived ease of use using multiple regression. Therefore, in this study, the researcher wants to determine if EE significantly influences the BI of halal auditors to adopt halal auditing apps.

Therefore, it is hypothesized that:

H2: Effort expectancy significantly influences the behavioral intention of halal auditors to adopt halal auditing apps.

Social Influence

Social influence (SI) is defined as “the degree to which an individual perceives that important others believe he or she should use the new system”, (Venkatesh et al., 2003). According to Taylor et al. (2011) survey of institutions in the Midwest of the United States, students' adoption and usage of mobile apps is largely affected by their peers as opposed to their family members. Furthermore, Leong et al. (2013a), utilizing survey questions that were gathered from mobile device users in Malaysia via SEM, demonstrated that SI plays a crucial role in persuading the BI to utilize m-entertainment. These empirical investigations concur that SI has a key role in persuading the BI to use mobile technologies. Therefore, in this study, the researcher wants to determine if SI significantly influences the BI of halal auditors to adopt halal auditing apps.

Therefore, it is hypothesized that:

H3: Social influence significantly influences the behavioral intention of halal auditors to adopt halal auditing apps.

Facilitating Condition

Facilitating condition (FC) is defined as “the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system”, (Venkatesh et al., 2003). FC strongly affects behavioral intention for 3G mobile telecommunication services, according to Wu et al., (2008). This empirical research concurs that FC plays a big role in persuading the BI to use technology. While Teo et al., (2012) countered that there was no significant effect of FC on the BI's adoption of technology. Therefore, in this study, the researcher wants to determine if FC significantly influences the BI of halal auditors to adopt halal auditing apps.

Therefore, it is hypothesized that:

H4: Facilitating condition significantly influences the behavioral intention of halal auditors to adopt halal auditing apps.

Anxiety

In the theory, even though anxiety (AX) is identified as not significant for their study, this factor will be use in this study to identify the significant of AX with behavioral intention of halal auditors to adopt halal auditing apps. Carlsson et al., (2006) study was tested the anxiety has no significant of behavioral intention in adoption new mobile apps. However, in this study, the researcher wants to determine if AX significantly influences the BI of halal auditors to adopt halal auditing apps.

Therefore, it is hypothesized that:

H5: Anxiety significantly influences the behavioral intention of halal auditors to adopt halal auditing apps.

Self - Efficacy

Self-efficacy (SE) refers to a user's view of his or her own talents, which is fundamentally an individual's subjective evaluation and can have a substantial impact on the user's intention to adopt (Balapour et al., 2019). In the theory, even though SE is identified as not significant for their study. However, this factor will be used in this study to identify the significance of SE with BI of halal auditors to adopt halal auditing apps.

Therefore, it is hypothesized that:

H6: Self - efficacy significantly influences the behavioral intention of halal auditors to adopt halal auditing apps.

Attitude Towards Using Technology

The definition of this factor is “an individual’s positive or negative feelings about performing the target behavior”, (Venkatesh et al., 2003). In the theory, even though this factor does not have direct significant towards behavioral intention, in this study, to test if the factor is significantly influencing the BI of halal auditors to adopt halal auditing apps will be done.

Therefore, it is hypothesized that:

H7: Attitude towards using technology significantly influences the behavioral intention of halal auditors to adopt halal auditing apps.

3.6 Conclusion

In conclusion, the adoption of halal auditing mobile apps, such as QuikHalal, is a promising solution to streamline the halal certification process in Malaysia. However, various factors influence the intention of halal auditors to adopt these technologies. The Unified Theory of Acceptance and Use of Technology (UTAUT) provides a comprehensive framework to understand the impact of performance expectancy, effort expectancy, social influence, and facilitating conditions on behavioral intention. Additionally, factors like anxiety, self-efficacy, and attitude towards using technology also play a significant role in determining the successful adoption of these apps. These findings highlight the need for a structured approach to encourage the adoption of digital tools within the halal certification process, addressing both technical and psychological barriers.

The findings of this study have important implications for halal auditors, app developers, and regulatory bodies like JAKIM. Halal auditors can benefit from digital tools that simplify workflows and enhance productivity, provided that user-friendly interfaces and adequate training are prioritized to build confidence. App developers are encouraged to design intuitive, performance-driven solutions tailored to auditors' operational needs, with robust support systems to facilitate adoption. For JAKIM, integrating digital auditing apps into official guidelines and offering incentives for their use can accelerate technological adoption, ensuring compliance with Islamic law and global standards. By addressing these factors, businesses and regulatory bodies can foster a smoother transition toward digitalization in the halal industry, ultimately improving the certification process and contributing to Malaysia's position as a leader in the global halal market. This study provides a strong foundation for future research and practical strategies to modernize halal auditing processes.

Acknowledgement

The authors would also like to thank the Faculty of Applied Sciences and Technology, Universiti Tun Hussein Onn Malaysia for its support.

References^[MABZ1]

- [1] Ahmed, R., Ibrahim, N., & Yusuf, M. (2023). Factors influencing the adoption of mobile apps for halal food verification: A user-centric approach. *International Journal of Halal Innovation and Technology*, 8(2), 125–140.
- [2] Amin, A. Z. M. (2021). Halal Auditing: The Study on the Effectiveness of Mobile Auditing Apps (QuikHalal) Towards Clients of Holistics Lab Sdn Bhd. Universiti Teknologi Mara: Thesis Degree.
- [3] Arif, S., Abu Bakar, N., & Sidek, S. (2019). A Framework to Investigate the Use of MYeHalal Online System in Malaysia. *International Journal of Human and Technology Interaction*, 3(2).
- [4] Balapour, A., Reyshav, I., Sabherwal, R., and Azuri, J. (2019). Mobile technology identity and self-efficacy: Implications for the adoption of clinically supported mobile health applications. *Int. J. Inform. Manage.* 49, 58–68. doi: 10.1016/j.ijinfomgt.2019.03.005

- [5] Bourgonjon, J., Valcke, M., Soetaert, R., & Schellens, T. (2010). Students' Perception About The Use Of Video Games In The Classroom. *Computers & Education*, 1145 - 1156.
- [6] Carlsson, C., Carlsson, J., Hyvonen, K., Puhakainen, J., & Walden, P. (2006). Adoption of mobile devices/services-searching for answers with the UTAUT. In *Proceedings of the 39th annual Hawaii international conference on system sciences (HICSS'06)* (Vol. 6, pp. 132a-132a). IEEE.
- [7] Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use and User Acceptance of Information Technology. *MIS Q*, 319-340.
- [8] Fadzil, N. S. M. (2022). The Study on The Effectiveness Of Quikhahal Among The Halal Auditors. Universiti Teknologi Mara: Thesis Degree.
- [9] Foon, Y. S., & Fah, B. C. Y. (2011). Internet banking adoption in Kuala Lumpur: an application of UTAUT model. *International Journal of Business and Management*, 6(4), 161.
- [10] Halal Development Corporation. (2022) Halal Industry Masterplan in Line with 2030 Goal <https://hdcglobal.com/news/2022/11/09/halal-industry-masterplan-in-line-with-2030-goal/>
- [11] Hasan, M., Ali, M., & Khan, S. (2022). Adoption of blockchain technology in halal food supply chains: A study of perceived benefits and challenges. *Journal of Halal Studies and Applications*, 5(3), 215-230.
- [12] Hoque, R., & Sorwar, G. (2017). Understanding factors influencing the adoption of mHealth by the elderly: An extension of the UTAUT model. *International Journal of Medical Informatics*, 101, 75-84. <https://doi.org/10.1016/j.ijmedinf.2017.02.002>.
- [13] Irfan, A., & Iskandar, M. (2017). Implementation of Halal Auditing Using Progressive Web Application.
- [14] Jais, A. S. (2016). Halal Assurance System (HAS) for Foodservice Organizations and Food Manufacturers (1st ed.). Merlimau: Politeknik Merlimau Melaka
- [15] JAKIM. (2020). Manual Prosedur Pensijilan Halal Malaysia (Domestik) 2020. <http://www.halal.gov.my/v4/index.php?data=bW9kdWxlcy9uZXdzOzs7Ow==&utama=panduan&ids=gp1>
- [16] K. Ghalandari, 2012. The Effect of Performance Expectancy, Effort Expectancy, Social Influence and Facilitating Conditions on Acceptance of E-Banking Services in Iran: the moderating role of Age and Gender. *Middle-East Journal of Scientific Research*, vol. 12(6),pp. 801-807.
- [17] Kamaruddin, R., Iberahim, H., & Shabudin, A. (2012). Halal compliance critical control point (HCCCP) analysis of processed food. *BEIAC 2012 - 2012 IEEE Business, Engineering and Industrial Applications Colloquium*, 383-387. <https://doi.org/10.1109/BEIAC.2012.6226088>.
- [18] Legris, P., Ingham, J., & Colletette, P. (2003). Why do people use information technology? A critical review of the technology acceptance model. *Information & Management*, 40, 191-204.
- [19] Leong, L. Y., Hew, T. S., Tan, G. W. H., & Ooi, K. B. (2013a). Predicting the determinants of the NFC-enabled mobile credit card acceptance: A neural networks approach. *Expert Systems with Applications*, 40(14), 5604-5620.
- [20] Maidhili, S., & Nithyanandam, K. (2017). External Audit and Non Conformance. *International Journal of Library Science and Research (IJLSR)*, 7(2), 35-38.
- [21] Malik, A., Suresh, S., & Sharma, S. (2017). Factors influencing consumers' attitude towards adoption and continuous use of mobile applications: a conceptual model. *Procedia computer science*, 122, 106-113.
- [22] Manual Procedure for Malaysia Halal Certification (Third Revision) (2014). Retrieved from www.halal.gov.my/v4/images/pdf/MPPHM2014BL.pdf.
- [23] Mat, N. K. N., Sulaiman, Y., Abdghani, N. H., & Mohamad, M. (2020). Halal Consumption Determinants: The Mediating Role of Risk Perception and Muslim Lifestyle. *Malaysian Journal Of Consumer And Family Economics*, 24. <https://www.researchgate.net/publication/348233319>.
- [24] Mohamad, M. N., & Othman, N. (2009). Audit pengesahan halal: Kajian di Jabatan Kemajuan Islam Malaysia. *Jurnal Penyelidikan Islam*, 22, 19-54. https://myjurnal.mohe.gov.my/filebank/published_article/34073/Article_2.PDF
- [25] Mohd Sulaiman, M. Z., Noordin, N., Nor, N. L., Suhaimi, A. I. H., & Wan Mohd Isa, W. A. R. (2018). The issues of halal inspection process from the perspective of demand and supply side in malaysia halal certification system. *Communications in Computer and Information Science*, 886, 277-288. https://doi.org/10.1007/978-981-13-1628-9_25
- [26] Noordin, N. (2013) Efficiency factors and ecosystem framework in Malaysian halal food certification system.
- [27] Orlikowski, W. J., & Gash, D. C. (1994). Technological frames: making sense of information technology in organizations. *ACM Transactions on Information Systems (TOIS)*, 12(2), 174-207.
- [28] Park, S. Y. (2009). An Analysis of the Technology Acceptance Model in Understanding University Students' Behavioral Intention to Use e-Learning. *Educational Technology & Society*, 12(3), 150-162.
- [29] Rahman, N. A. A., Hassan, A., & Mohammad, M. F. N. (2020). Halal Logistics and Supply Chain Management in Southeast Asia. Taylor & Francis.
- [30] Rogers, E. M. (1995). Diffusion of Innovations. New York: Free Press.

- [31] Rokshana Shirin Asa, B. (2016). A STUDY OF THE LAWS REGULATING HALAL CERTIFICATION MARKS AND LOGO IN MALAYSIA.
- [32] Shaqrah, A., & Almars, A. (2022). Examining the internet of educational things adoption using an extended unified theory of acceptance and use of technology. *Internet of Things*, Vol. 19, 100558. <https://doi.org/10.1016/I.IOT.2022.100558>
- [33] Šumak, B., & Šorgo, A. (2016). The acceptance and use of interactive whiteboards among teachers: Differences in UTAUT determinants between pre-and post-adopters. *Computers in Human Behavior*, 64, 602-620.
- [34] Šumak, B., Pušnik, M., Heričko, M., & Šorgo, A. (2017). Differences between prospective, existing, and former users of interactive whiteboards on external factors affecting their adoption, usage and abandonment. *Computers in Human Behavior*, 72, 733-756.
- [35] Tan, G. W. H., Sim, J. J., Ooi, K. B., & Phusavat, K. (2012). Determinants of mobile learning adoption: an empirical analysis. *Journal of Computer Information Systems*, 82-91.
- [36] Taylor, S. and Todd, P. (1995). The Role of Prior Experience. *MIS Quarterly*, 19(4), 561-570.
- [37] Taylor, D. G., Voelker, T. A., & Pentina, I. (2011). Mobile application adoption by young adults: A social network perspective. *International Journal of Mobile Marketing*, 6(2), 60-70.
- [38] Teo, T., & Noyes, J. (2012). Explaining the intention to use technology among pre-service teachers: A multi-group analysis of the Unified Theory of Acceptance and Use of Technology. *Interactive Learning Environments*, 2(1), 51-66.
- [39] The Malaysian Insight. (2019, January 12). Halal Status Not Mandatory For Eateries, Says Jakim Chief. Retrieved from <https://www.themalaysianinsight.com/s/125369>.
- [40] Thottoli, M. M., & Thomas, K. V. (2022). ERP Software and Practicing Auditors: An Empirical Study Applying UTAUT Model. *International Journal of Innovation in the Digital Economy (IJIDE)*, 13(1), 1-13.
- [41] Tornatzky, L. and Fleischer, M. (1990) *The process of technology innovation*, Lexington, MA, Lexington Books.
- [42] Tsai, Y.-Y., Chao, C.-M., Lin, H.-M., and Cheng, B.-W. (2018). Nursing staff intentions to continuously use a blended e-learning system from an integrative perspective. *Qual. Quant.* 52, 2495–2513. doi: 10.1007/s11135-017-0540-5
- [43] Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS quarterly*, 425-478.
- [44] Widiani, Y. N., & Abdullah, A. (2018). Analisis Pengaruh Kualitas Pelayanan E-Government Melalui Aplikasi E-Filing Kantor Pelayanan Pajak Pratama Bandung Cibeunying Terhadap Kepuasan Pengguna Aplikasi. *Jurnal Riset Bisnis Dan Manajemen*, 11(2), 88–96. <https://doi.org/10.23969/IRBM.V11I2.721>.
- [45] Wu, Y. L., Tao, Y. H., & Yang, P. C. (2007, December). *Using UTAUT to explore the behaviour of 3G mobile communication users*. Paper presented at the Industrial Engineering and Engineering Management (IEEE, 2007) International Conference, Singapore.
- [46] Zhou, T., Lu, Y. B., & Wang, B. (2010). Integrating TTF and UTAUT to explain mobile banking user adoption. *Computers in Human Behavior*, 26(4), 760-767.