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The Impact of Digital Media Use on Muslim Entrepreneurs' Intention to Apply for Halal Certificate: Empirical Evidence from Indonesia

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Abstract: *The Indonesian government is striving to encourage Muslim entrepreneurs to obtain halal certification for all products produced, imported, and sold within Indonesia. Digital media has emerged as a viable solution to enhance the convenience and practicality of Muslim entrepreneurs in applying for halal certification. This study aims to examine factors that influence Muslim entrepreneurs' halal certification applications through digital media, using the DeLone and McLean and the Unified Theory of Acceptance and Use of Technology (UTAUT) models. This quantitative study analyses 350 Indonesian Muslim entrepreneurs using partial least square structural equation modeling (PLS-SEM). Researchers obtain data using non-probability sampling approaches. The results of the study indicate that the constructs of performance expectancy (PE), effort expectancy (EE), social influence (SI), and service quality (SEQ) have a positive and significant effect on intention (INT). In addition, the facilitating condition (FC) has a positive influence on INT but is not significant. While the constructs of system quality (SYQ) and information quality (IQ) have a positive and significant effect on user satisfaction (US), the correlation of the two constructs to INT is not significant. Therefore, it can be concluded that PE, EE, and SI are the key driving factors for Muslim entrepreneurs in using digital media to apply for halal certification. According to the results, developing user-friendly features and technology systems is highly recommended. Pre- and post-submission service quality must be improved. Therefore, halal process assistance officers (PPH) are proposed to support Indonesian Muslim entrepreneurs.*
Keywords: DeLone and McLean, digital media, halal certificate, Muslim entrepreneurs, UTAUT

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1. Introduction

Halal certificates have become a must-have item for every entrepreneur in Indonesia, especially for entrepreneurs in the food sector. A halal certificate is a statement from a halal body, which is a supervisory organization that grants halal certificates, stating that the company produces halal products (Ab Talib et al., 2017). In accordance with the regulations of law number 33 of 2014, which pertains to the halal product guarantee, all products that are imported, transported, and traded within Indonesia must be halal certified (Hanim & Noorman, 2023). The purpose of the issuance of these regulations is to be able to adapt to the development of the halal industry in Indonesia and globally, as well as dynamic market demands related to halal products. The halal certification policy functions not only as a regulatory obligation but also as an institutional pressure that shapes business actors' behavior (Timur et al., 2023).

According to the State of the Global Islamic Economy Report 2023/2024. by Dinar Standard, Indonesia is ranked third based on the Global Islamic Economy Indicator (GIEI) index among 81 countries with the strongest Islamic economic ecosystem in the world. According to the Masterplan Indonesia Halal Industry 2023-2029 by the National Islamic Finance Committee, it is projected that by 2025, the halal food and beverage sector will account for the majority of the US$282 billion worth of halal products consumed in Indonesia. The rapid growth of the halal products and services business raises new concerns and challenges. Halal standard management and measurement standards are urgently needed to guide suppliers and producers of halal products and services (Hanifasari et al., 2024). Therefore, it is necessary to establish distinct regulations to enhance the productivity of halal goods and services while simultaneously safeguarding consumers' entitlement to assured halal products and services (Hanim & Noorman, 2023). The Indonesian government requires halal certificates for all products entering, circulating, and sold in Indonesia under regulation No. 39 of 2021 (Alamsyah et al., 2022; Sudarsono et al., 2024). In contrast to law number 33 of 2014, this law includes the elaboration of implementing regulations related to entrepreneurs, submission of applications and extension of halal certificates, halal labels and non-halal certificates, community participation, electronic-based services, and elaboration of administrative sanctions, including obligations and penalties for entrepreneurs if they do not have a halal certificate before October 2026 (Nugraha, 2021). The ownership of halal certificates by all entrepreneurs in Indonesia aims to ensure the use of healthy ingredients that follow strict manufacturing and production regulations in accordance with Islamic law, which shows that they are processed in a way that does not jeopardize their purity (Permani et al., 2023).

From a business perspective, as more people become Muslims, the demand for food that is recognized as halal also increases. Azam et al. (2024) say that the huge rise in demand for halal goods and services this decade presents a big chance for business owners, makers, stakeholders, and government agencies to grow the halal market and make the most of this lucrative market segment. The obligation to have a halal certificate for micro and small businesses and imported products will only come into effect on October 17, 2026 (Karyani et al., 2024). This relaxation gives entrepreneurs a chance to meet their duty to have a halal license by the due date set by the Indonesian government. According to the findings of a study conducted by Muneeza and Mustapha (2021), entrepreneurs would at the very least receive benefits from both within and outside the company if they have halal certification for the business that they are operating. Due to the fact that they are required to pass a set of tests that not only involve raw materials and processing but also all elements from upstream to downstream, products that have halal certificates will have a higher quality of product (Jaiyeoba et al., 2020). In addition, products that have been certified as halal have the advantage of having better marketing characteristics and a bigger market share (Badruldin et al., 2012).

This situation reflects not only a regulatory push but also a market pull, where business actors are driven by increasing demand and the potential profitability of halal-certified products (Timur et al., 2025). Theoretically, this aligns with the concept of performance expectancy, which posits that an individual's intention to engage in a behavior is influenced by their expectation of positive outcomes (Venkatesh et al., 2003). Individuals are more likely to adopt a technology or system if they believe it will enhance their work or business performance. Therefore, the motivation to adopt halal certification through digital media can, in part, be explained by the extent to which Muslim entrepreneurs perceive it as contributing to their business success (Venkatesh et al., 2003). The fact that there are only a few entrepreneurs in Indonesia who register their products in order to receive halal certification continues to be a barrier and a challenge for the development of the halal industry in Indonesia. According to the Masterplan Indonesia Halal Industry 2023-2029 by the National Islamic Finance Committee, the proportion of entrepreneurs in Indonesia who hold halal certificates is now barely 1%. A number of

studies have found that the complicated process of obtaining a halal certificate is the main reason many companies avoid it. Muneeza and Mustapha (2021) said that one of the key problems is that business owners do not have adequate understanding and information on the relevance of halal certification. Hanim and Noorman (2023) said that the application process for halal certification is often challenging for entrepreneurs in Indonesia. Several issues, such as high expenses, a lack of awareness and education about halal, and other related factors, have been identified as contributing to this challenge (Puspaningtyas, 2021). In addition, the lengthy inspection and control procedures, as well as the unpredictability of the prices, are also significant considerations (Ab Talib, 2017).

The Halal Product Assurance Organizing Body (BPJPH), a non-ministerial government agency in Indonesia directly accountable to the President of the Republic of Indonesia, has introduced an innovation in halal certification services to facilitate the halal certification process for entrepreneurs. These services are available to eligible parties who meet specific requirements and can be accessed through the self-declaration program via digital media (Musataklima, 2021). The digital platform is web-based, specifically www.ptsp.halal.go.id, which serves as the central hub for all halal certification applications and related services. Within this website, there is the SIHALAL application, which is an integrated part of the halal certification services provided through www.ptsp.halal.go.id, designed for entrepreneurs to track the status of their halal certification applications. This transformation alleviates the administrative burden for users and enhances their sense of service quality by providing accessible, real-time information and guided support throughout the process. For numerous entrepreneurs, the simplicity of maneuvering through the system diminishes the apparent exertion required for certification, while the promptness and transparency of information bolster their assurance in the process. These views significantly influence contentment and the intention to persist in utilizing the platform in the future. Following the digitalization of halal certificate applications via the self-declaration system, there has been a notable rise in the number of entrepreneurs seeking halal certification. The Indonesian government has established a Halal Product Process Assistant (PPH) to streamline the halal certification application procedure. This program aids enterprises in self-declaring and validating their halal product assertions (Timur & Sari, 2023).

However, there are still numerous problems associated with utilizing digital media in the process of obtaining halal certification. Digital media users are concerned about data security, privacy, governance, and criminal exploitation (Berakon et al., 2023; Buldas et al., 2022; Darmalaksana, 2023). Quality and convenience of use are also key drivers of digital media adoption. Based on this background, this study uses the DeLone McClean and Unified Theory of Acceptance and Use of Technology (UTAUT) models to determine what factors influence Muslim entrepreneurs' halal certification applications. The UTAUT model is a model to explain user behavior toward information technology from five aspects (Venkatesh et al., 2003). Effort expectancy (EE) indicates that technology has the potential to satisfy users by being viewed as easy to use and practical (Timur et al., 2024). When halal certification processes are perceived as less complex and demanding, particularly through digital platforms that simplify the application and validation procedures, entrepreneurs are more motivated to pursue certification. This increased EE lowers perceived barriers to entry, encouraging Muslim entrepreneurs to apply for halal certification and enhancing their willingness to comply with regulatory standards (Timur et al., 2023).

Similarly, factors related to social influence (SI), such as social reviews, social responsibility, and social perceptions, can have an impact on individuals' utilization of media and the internet. SI can provide a sense of trust and validation, encouraging others to follow suit (Pratiwi et al., 2024). Suppose halal certification is perceived as a mark of quality and credibility within the community. In that case, entrepreneurs are more likely to view it as a necessary step for ensuring their business's success and acceptance. Thus, SI becomes a powerful driver, encouraging Muslim entrepreneurs to apply for halal certification as part of their desire to conform to social expectations and strengthen their position in the market while adhering to Islamic principles.

A person's propensity to use technology is contingent on adequate facilitating condition (FC) or support, especially for certain resources, provided that the technology aligns with their previous technology experience (Ammar & Ahmed, 2016). The process of obtaining a halal certificate involves intricate procedures that may discourage business actors from pursuing the necessary steps (Huda et al., 2024). Consequently, numerous prior investigations elucidate the impact of UTAUT characteristics on an individual's inclination to make a decision. A person's propensity to use technology is contingent on adequate FC or support, especially for certain resources, provided that the technology aligns with their previous technology experience (Ammar & Ahmed, 2016). The process of obtaining a halal certificate

involves intricate procedures that may discourage business actors from pursuing the necessary steps. Access to training programs, online resources, and technical support can significantly reduce perceived barriers to entry, increasing entrepreneurs' confidence in their ability to complete the certification process successfully (Siska et al., 2020). Additionally, the availability of government-supported platforms, such as digital applications for halal certification, can offer the necessary tools and guidance that align with the entrepreneurs' prior technology experiences (Husaeni & Ayoob, 2024).

Then, the DeLone and McLean model measures information system efficacy from the user's perspective (DeLone & McLean, 2016). When it comes to using technology for halal certification, the application of information systems and technology, as described by the DeLone and McLean Success model, can determine user satisfaction (US). This applies specifically to entrepreneurs, which in turn has an impact on individuals' intentions to apply for halal certificates. According to Haque et al. (2022), the presence of high-quality information, systems, and services is linked to increased user satisfaction, greater system usage, and favorable effects on individuals and organizations. The government, in its capacity as a regulator, is currently preparing to incorporate technology and information systems into the halal industry sector. This integration is intended to improve the efficiency and effectiveness of the services that are provided by halal certificates (Tworek, 2018). Prior studies have demonstrated that the utilization of digital media can yield favorable outcomes in terms of performance and happiness for individuals involved in the halal industry (Tran, 2023). Nevertheless, it remains uncertain if the utilization of digital media can also effectively stimulate the inclination of commercial entities to seek Halal certification, therefore necessitating further investigation

To further strengthen this framework, user satisfaction (US) can be theoretically positioned as a mediating variable between the quality dimensions of information systems—namely system quality, service quality, and information quality, and the intention to use digital platforms for halal certification. This mediating role has been recognized in extended IS literature, where satisfaction not only reflects users' evaluation of their digital experience but also serves as a proximal determinant of continued usage behavior and intention (Pham & Dau, 2022; Al-Hattami et al., 2024; Kamboj et al., 2022). In the context of halal certification, satisfaction with digital services, such as timely assistance, reliable information, and ease of platform use, may shape entrepreneurs' perceptions of the value of technology and increase their motivation to adopt and use it consistently. Therefore, exploring satisfaction as a bridge between system quality and behavioral intention enriches both the explanatory power and practical relevance of this study.

Previous studies on entrepreneurs' halal certification behavior focused on internal constructs like attitude, subjective norm, and perceived behavioral control from the theory of planned behavior model (Sudarmiatin et al., 2020). In addition, Katuk et al. (2021) use performance belief, halal knowledge, and many business attributes to measure Muslim entrepreneurs' desire to apply for halal certificates for their business products. Most other studies still focus on how halal certification increases consumer intention to purchase halal products (Halimi et al., 2022; Jaiyeoba et al., 2020; Usman et al., 2024), business performance (Ab Talib et al., 2017; Amer, 2023), and business actor perception (Badruldin et al., 2012; Darmalaksana, 2023). To the best of the author's knowledge, this research is the first study to identify the behavioral intentions of Muslim entrepreneurs in applying for halal certificates through website-based digital media such as www.ptsp.halal.go.id with the DeLone and McLean and UTAUT models. In addition, this study extends the application of the UTAUT and DeLone and McLean models into the domain of religious compliance technology. This interface remains underexplored in current information systems research. The results of this study will provide practical implications for the government, especially in developing information systems and digitalization, to support the acceleration of halal certificate ownership for Muslim entrepreneurs in Indonesia.

2. Materials and Methods

2.1. Research Design

This study aims to identify the key factors that influence Muslim entrepreneurs in Indonesia when they utilize digital media to apply for halal certification procedures. Items with various attributes were rated using a 7-point Likert scale, which includes values that range from strongly disagree to strongly agree. The questionnaire was divided into two parts; the first part covered the demographics of the respondents, such as gender, age, education, domicile, and gross revenue per year. The second part consisted of questions that included an indication of the constructs used in this study. The participants involved in this study had several prerequisites that had to be met. The respondents were Indonesian citizens aged between 17 and 70 years old and were entrepreneurs by profession. Next, the respondent's business has

obtained a halal certificate. In addition, the respondents have knowledge of the procedures and requirements for obtaining halal certificates and have experienced or used digital media to apply for halal certificates in Indonesia. It is necessary to reject respondents who do not fulfill the requirements for this study, so a pre-quotient assessment is carried out in order to determine which respondents are eligible for participation in this study. In general, the items that were used for measurement in this study were derived from earlier research and then updated in accordance with the existing research model and the context. Figure 1 provides a visual representation of the research hypothesis model that will be explored in this study.

This study integrated the UTAUT and DeLone and McLean IS Success Model to examine the factors influencing Muslim entrepreneurs' intention to apply for halal certification through digital platforms. The UTAUT model assessed behavioral intention based on four constructs: performance expectancy, effort expectancy, social influence, and facilitating conditions. These factors reflected the perceived usefulness, ease of use, social encouragement, and technical support associated with the digital system. Meanwhile, the DeLone and McLean model evaluated system effectiveness through information quality, system quality, and service quality, which were hypothesized to influence user satisfaction. Satisfaction was positioned as a mediating variable that connected system quality dimensions to the intention to use the platform. This framework provided a comprehensive understanding of both user behavior and digital service performance in the context of halal compliance—a topic still underexplored in current information systems research. Overall, the hypothesis model used in this study is visualized in Figure 1.
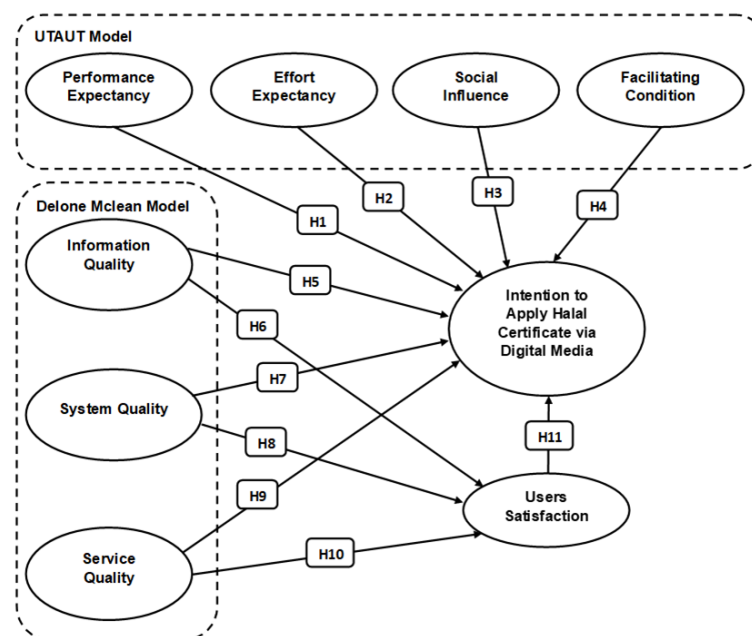

Figure 1. Hypotheses model

2.2. Data Collection

The researchers obtained data using a non-probability sampling approach with a purposive sampling technique. This approach was employed to select individuals from the population who met specific research criteria (Fallah & Soori, 2023). Information is gathered via administering online surveys and distributing them over various social media platforms such as Whatsapp, LINE, Instagram, Facebook, and others. The online survey was disseminated over four months, commencing in November until December 2023. An acknowledgment must be made that this study used a non-probability sampling method, which limited the ability to generalize the findings to the broader population. The selection of participants was based on specific criteria rather than randomization, which may have introduced sampling bias. In addition, the online distribution of the survey posed a risk of response bias due to self-selection. Individuals who were more interested in the topic or more active on social media platforms were more likely to participate, potentially affecting the diversity and representativeness of the sample.

Before filling out the questionnaire, respondents are required to fill in a written statement of consent as valid evidence that the respondent is willing to fill out the questionnaire in accordance with the provisions expected by the author in this study. Besides that, this study followed ethical standards and was approved by the ethics committee of The Institute for Research and Community Service,

Universitas Negeri Surabaya. In total, we obtained comments from 396 participants. Several samples were deemed ineligible due to their failure to match the specified requirements, rendering them unable to proceed to the subsequent stage of processing. However, after conducting a screening process, 46 responses were excluded due to not meeting the inclusion criteria, such as not being involved in MSME activities, providing incomplete answers, or failing the attention check embedded within the questionnaire. At the last stage, the number of responders whose data may be processed is 350. According to Hair et al. (2019), the minimal sample size for partial least squares structural equation modeling (PLS-SEM) analysis should be between 100 and 200, depending on the complexity of the model.

2.3. Method of Analysis
This study employed a quantitative research design and utilized the partial least squares structural equation modeling (PLS-SEM) approach using Smart-PLS 3.0 software. PLS-SEM was selected due to the complex structure of the research model and the presence of non-normal data, as noted by Hair et al. (2019). The complexity referred to a framework that integrated both reflective and formative constructs while also incorporating moderating variables. PLS-SEM was particularly well-suited for exploratory and predictive modeling, especially in studies that combined multiple theoretical frameworks. In this study, PLS-SEM allowed the researchers to analyze the interplay between constructs drawn from the Unified Theory of Acceptance and Use of Technology (UTAUT) and the DeLone and McLean Information System Success Model. This methodological choice was made because PLS-SEM was robust in handling multicollinearity, small to medium sample sizes, and formative indicators, making it ideal for testing the combined theoretical model proposed in the study.

The analysis followed the three-step procedure recommended by Hair et al. (2019). First, the measurement model was evaluated by assessing the reliability and validity of the constructs. Construct reliability was verified using composite reliability and Cronbach's alpha, with acceptable thresholds of >0.70 and >0.60, respectively. Validity was measured using the average variance extracted (AVE), with a minimum acceptable value of 0.50. Second, the structural model was assessed to examine both direct relationships and moderation effects. The model included moderating variables such as Islamic religiosity and digital media usage intensity to explore their influence on the main relationships. This approach allowed the study to test whether these contextual factors strengthened or weakened the effects of key predictors on the intention to apply for halal certification. The model's predictive accuracy was evaluated using R^2 values of 0.25, 0.50, and 0.75, representing weak, moderate, and substantial explanatory power. Hypothesis testing was conducted using a significance level of 5%, with a critical t-value of 1.98 and a threshold p-value of <0.05. Third, robustness checks were performed to test the assumption of linearity in the SEM model. It included examining quadratic effects to ensure that the relationships between constructs were appropriately modeled and to detect any potential non-linear patterns that could affect interpretation.

3. Results and Discussion
3.1. Respondent Demography
The initial demographic data that can be extracted from the survey replies of the 350 participants is their gender (See Table 1). A total of 188 male participants, accounting for 54% of the total responses, took part in this study. By comparison, 162 responses, which account for 46% of the total, were from females. Furthermore, out of the total number of respondents, which amounted to 138 individuals, 58% of them fell within the age range of 17 to 30 years. This age group constituted the largest portion of participants in the study. A total of 206 respondents, which accounts for 59% of all respondents, possessed a senior high school degree, which is the highest level of education. The respondents, predominantly young and with at least a senior high school education, likely possess a higher level of understanding and use of technology or digital media. Meanwhile, the East Java province has the highest number of respondents, with a total of 110 respondents, accounting for 31% of the total respondents. This fact also supports that East Java, as one of the more developed provinces in Indonesia, has the availability of internet infrastructure, which plays a significant role in digital media usage, making the findings of this study more relevant to the research objectives. Then, out of the 350 Muslim entrepreneurs who took part in this study, 302 individuals accounted for 86% of the total responses.

3.2. Model Fit Testing
Before conducting outer and inner model testing, the model is executed. The objective of this study is to evaluate the appropriateness of the proposed model. Researchers should exercise caution when

reporting the results of model fit testing, as there is currently no universally accepted threshold value for each specific type of test (Hair et al., 2019). Furthermore, the model fit assessment in this study was conducted to ensure the alignment between the actual data and the predicted outcomes of the structural model, which was developed based on the UTAUT and DeLone and McLean frameworks.

Table 1. Respondent Demography

Demography	Frequency	Percentage (%)
Gender		
Male	188	54
Female	162	46
Age		
17-30 years old	138	58
31-40 years old	123	30
41-50 years old	86	11
51-60 years old	3	1
>60 years old	0	0
Educational Background		
Senior High School	206	59
Diploma/Bachelor	120	34
Master	19	5
Doctoral	5	2
Provinces		
DKI Jakarta	45	13
Banten	2	1
West Java	65	19
Central Java	48	14
DIY Yogyakarta	12	3
East Java	110	31
Others	68	19
Gross Revenue Per Year		
IDR 0-300.000.000	302	86
IDR 300.000.001-2.500.000.000	48	14
>IDR 2.500.000.001	0	0

This alignment indicates that the structural model is reliable in representing the phenomenon under investigation. In order for the model to meet the criterion for model fit, the standardized root mean square (SMSR) value must be less than 0.05. Other factors that can be used as criteria for evaluating model fit, or restrictions are as follows: Root mean square theta (RMS Theta) should be below 0.102; SRMR should be below 0.10 or 0.08; and normed fit index (NFI) should be above 0.9. Table 2 shows that all values in the model fit test fulfill the criteria. Therefore, we may infer that the overall model meets the criteria for the average size of the difference between the observed and expected correlations, which is used as an absolute measure of the fit criteria for the model.

Table 2. Model Fit

Fit Criteria	Saturated Model	Estimated Model
SRMR	0.047	0.043
d_ULS	2.951	3.593
d_G	1.138	1.176
Chi-Square	1599.593	1635.043
NFI	0.975	0.970
RMS Theta	0.044	

3.3. Measurement Model Assessment

Following that, the next phase consisted of putting the measuring model into action. This stage was broken up into three distinct stages. In the first place, the findings demonstrated that the measuring scale

of the outer model made a considerable contribution to each construct (Hair et al., 2019). Furthermore, the score of the internal weights on the indicators that were investigated revealed loading factors that were greater than 0.70 (ranging from 0.720 to 0.964)(See Table 3). In addition to that, we utilized Cronbach's alpha (α) and composite reliability (CR) in order to evaluate the dependability of the research construct. In the study conducted by Hair et al. (2019). it was shown that the values of α (ranging from 0.816 to 0.944) and CR (ranging from 0.881 to 0.964) exhibited superior internal consistency, surpassing the threshold of a and CR>0.70.

Table 3. Construct Validity and Reliability

Constructs	Item	Factor Loading
Performance Expectancy (α = 0.903; CR = 0.927; AVE = 0.719) [a, b, c, d, e]		
PE1	I found that digital media can be useful for applying for halal certificates	0.839
PE2	Using digital media can speed up the halal certificate application	0.872
PE3	Using digital media helps me apply for the halal certificate effectively	0.866
PE4	Using digital media to apply for the halal certificate can increase my productivity	0.822
PE5	Using digital media to apply for a halal certificate can increase the effectiveness of the time I have	0.838
Effort Expectancy (α = 0.856; CR = 0.913; AVE = 0.778) [a, b, c, d, e]		
EE1	Learning how to use digital media to apply for halal certificates is easy	0.907
EE2	My interaction with digital media to apply for a halal certificate is easy to understand	0.917
EE3	I feel that digital media is easy to use to apply for a halal certificate	0.820
Social Influence (α = 0.825; CR = 0.896; AVE = 0.743) [a, b, c, d, e]		
SI1	My family, friends, colleagues, and people who I consider important in my life think that I should use digital media to apply for the halal certificate.	0.902
SI2	People who influence me think that I should use digital media to apply for the halal certificate	0.903
SI3	Religious leaders/ulama/lecturers/teachers, and people whose opinions I respect think that I should use digital media to apply for the halal certificate.	0.775
Facilitating Condition (α = 0.816; CR = 0.890; AVE = 0.730) [a, b, c, d, e]		
FC1	I have the resources to use digital media to apply for the halal certificate	0.855
FC2	I know how to use the digital media to apply for the halal certificate	0.855
FC3	I receive instructions on how to apply for a halal certificate through digital media	0.854
Information Quality (α = 0.943; CR = 0.964; AVE = 0.899) [f, g, h, i]		
IQ1	Digital media used to apply for halal certificates can provide me with accurate information	0.922
IQ2	Digital media used to apply for halal certificates can provide me with the information I need in a timely manner.	0.964
IQ3	Digital media used to apply for halal certificates can provide me with new and current information	0.957
System Quality (α = 0.835; CR = 0.881; AVE = 0.598) [f, g, h, i]		
SYQ1	I feel that digital media for applying for a halal certificate is fast, consistent, and reasonable.	0.793
SYQ2	The digital media makes it easy for me to find information on applying for a halal certificate.	0.720
SYQ3	Digital media can combine data from various sources effectively, which aims to make it easier to apply for halal certificates.	0.817
SYQ4	Digital media used to apply for halal certificates is reliable	0.810
SYQ5	By using digital media, I can trace the progress of my halal certificate application.	0.723
Service Quality (α = 0.944; CR = 0.960; AVE = 0.856) [f, g, h, i]		
SEQ1	I feel that the service in the Companion program for the halal product process or PPH helps me in applying for a halal certificate through digital media.	0.911
SEQ2	When you have a problem in applying for a halal certificate, the system services in digital media are able to show genuine interest in solving it.	0.911
SEQ3	You feel safe in applying for a halal certificate with digital media	0.947
SEQ4	Digital media system services for applying for halal certificates provide individualized attention to you.	0.932
User Satisfaction (α = 0.895; CR = 0.927; AVE = 0.761) [f, g, h, i]		
US1	I am satisfied with the performance of the digital media I used in applying for a halal certificate	0.858

Table 3. Construct Validity and Reliability (continued)

Constructs	Item	Factor Loading
US2	I am satisfied with the experience I got in applying for a halal certificate using digital media	0.877
US3	I am satisfied with the functions provided by the digital media I use in applying for a halal certificate	0.893
US4	I am satisfied with the overall experience I got in applying for a halal certificate using the digital media	0.861
Intention to Apply Halal Certificate ($\alpha = 0.882$; CR = 0.911; AVE = 0.631) [f, g, h, i]		
INT1	I intend to continue to organize all activities related to halal certificates using digital media	0.806
INT2	I will always try to take care of all activities related to halal certificates in my life using digital media	0.770
INT3	I plan to take care of halal certificates using digital media in the future	0.877
INT4	Applying for a halal certificate with digital media will be my first choice	0.803
INT5	digital media guides me to consider applying for a halal certificate	0.770
INT6	Using digital media encourages me to decide to apply for a halal certificate	0.734

Notes: a. Venkatesh et al. (2003), b. Sunarsih et al. (2023), c. Mohd Suki et al. (2022), d. Ahmad & Yahaya (2022), e. Lampo et al. (2023), f. DeLone & McLean (2003), g. Pham & Dau (2022), h. Al-Hattami et al. (2024), i. Kamboj et al. (2022)

Additionally, the average variance extracted (AVE) and Heterotrait–Monotrait ratios (HTMT) were utilized to implement the application of convergent and discriminant validity. According to the findings, the overall value adhered to the predetermined criteria, particularly, the AVE was greater than 0.50 (See Table 3), and the HTMT was less than 0.90 (Hair et al., 2019) (See Table 4). Therefore, the possibility of invalidity is eliminated due to the presence of all reflective structures.

Table 4. Heterotrait-Monotrait (HTMT)

Construct	EE	FC	IQ	INT	PE	SEQ	SI	SYQ	US
EE									
FC	0.089								
IQ	0.643	0.059							
INT	0.647	0.235	0.542						
PE	0.591	0.201	0.729	0.650					
SEQ	0.302	0.215	0.422	0.506	0.507				
SI	0.494	0.277	0.463	0.634	0.587	0.425			
SYQ	0.358	0.247	0.292	0.520	0.384	0.590	0.532		
US	0.526	0.216	0.637	0.580	0.749	0.496	0.464	0.466	

3.4. Structural Model Assessment

The bootstrapping test in PLS-SEM aims to measure the relationship between constructs. The influence between constructs can be seen from the p-values. P-value > 0.05 can indicate that the constructs significantly affect the independent constructs. In contrast, if the p-value > 0.05, the constructs do not affect the dependent constructs (Hair et al., 2019). The relationship between constructs (positive or negative) can be seen from the original sample value. If the original sample value is positive, then the relationship between the measured constructs can be positive, and vice versa. Overall, the bootstrapping results showing the relationship between constructs are shown in Figure 2 and Table 5.

The results of the bootstrapping test show that of the 11 hypotheses tested in this study, four hypotheses were built based on the UTAUT model, and seven hypotheses were built based on the DeLone and McLean model. In the first four hypotheses built based on the UTAUT model, the statistical test results show that there are three accepted hypotheses and one rejected hypothesis. In the first hypothesis result (PE → INT), it is evident that the β coefficient has a positive value of 0.189, and the p-value is less than 0.05 (specifically, 0.019). Therefore, we can confidently conclude that the first hypothesis is accepted. When users feel the increasing benefits of using digital media services when applying for halal certificates, their intention level will also increase. Users are happy with the comprehensive features in that increase accuracy and speed when applying for halal certificates with digital media. Intention to use digital media is influenced by cognitive factors such as PE and other factors such as user emotions and the level of pleasure experienced when using digital media (Fu & Mishra, 2022). In addition, the long process flow that must be followed and the lack of information and knowledge possessed by entrepreneurs is also one of the main driving factors for Muslim entrepreneurs in finding other alternative ways to apply for halal certificates (Lestari et al., 2023).
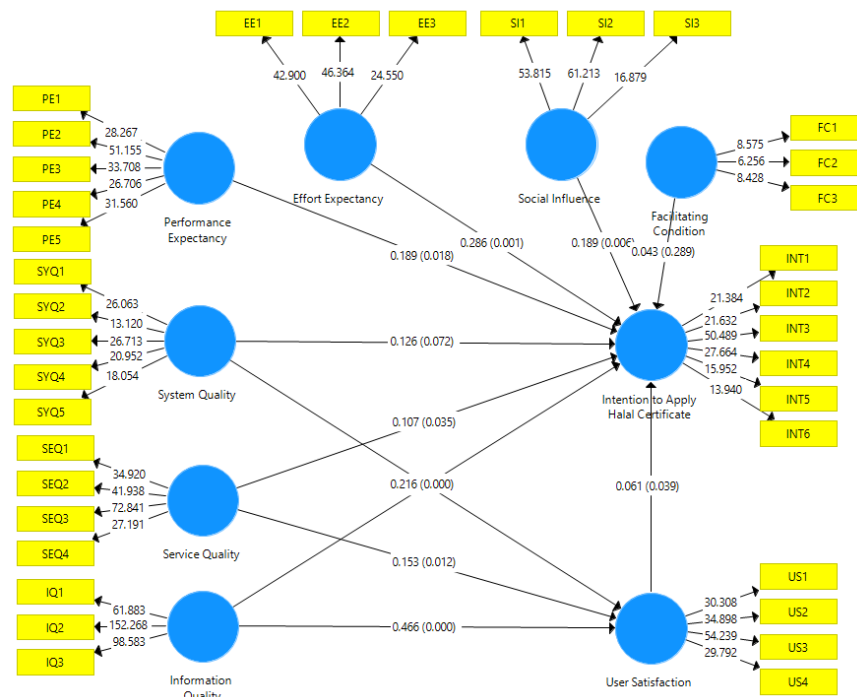
Figure 2. Bootstrapping Result

On the other hand, several studies, such as Dutta and Mishra (2024), suggest that the more complex the features offered by technology, the more likely it is to create a condition known as technostress (stress caused by the use of technology), which ultimately leads to negative impacts on the intention to use the technology, including digital media. In this study, the relationship between PE and INT is found to be positive, meaning that the benefits provided by the features on the website www.ptsp.halal.go.id align with the needs of Muslim entrepreneurs, facilitating their activities in applying for halal certificates. In the context of different objects, the results of the first hypotheses are the same as the results of previous studies such as the results of Venkatesh et al. (2003), Sunarsih et al. (2023), Mohd Suki et al. (2022), Ahmad and Yahaya (2022), and Lampo et al. (2023) which also states that PE has a positive and significant effect on INT, but in a different context.

Table 5. Direct Effect and Multicollinearity Results

PLS-Path	Standard Beta (β)	T-statistics	p-values	Results	VIF	f²	Collinearity Result
PE → INT	0.189	2.359	0.019	Accepted	2.704	0.198	No Multicollinearity
EE → INT	0.286	3.457	0.001	Accepted	1.671	0.164	No Multicollinearity
SI → INT	0.189	2.893	0.004	Accepted	1.628	0.157	No Multicollinearity
FC → INT	0.043	1.051	0.294	Rejected	1.103	0.164	No Multicollinearity
IQ → INT	0.013	0.173	0.863	Rejected	2.265	0.160	No Multicollinearity
IQ → US	0.466	8.152	0.000	Accepted	1.195	0.322	No Multicollinearity
SYQ → INT	0.126	1.785	0.075	Rejected	1.691	0.180	No Multicollinearity
SYQ → US	0.216	3.542	0.000	Accepted	1.430	0.158	No Multicollinearity
SEQ → INT	0.107	2.206	0.028	Accepted	1.691	0.015	No Multicollinearity
SEQ → US	0.153	2.527	0.012	Accepted	1.575	0.026	No Multicollinearity
US → INT	0.061	0.725	0,039	Accepted	2.128	0.004	No Multicollinearity

In the second hypothesis test (EE → INT), the statistical test results show a positive β value (0.286), and the p-value <0.05 (0.001), it can be concluded that the second hypothesis is also accepted. Users can feel the maximum benefit from a technology when they can easily use it (Nurfadilah et al., 2023). It is very helpful for Muslim entrepreneurs because most of them are individuals who have businesses and are busy at work, so they have limited time to collect requirements, submit, and monitor the progress of applying for a halal certificate. In the context of different objects, the results of the second hypothesis are the same as the results of previous studies such as the results of Venkatesh et al. (2003), Sunarsih et al. (2023), Mohd Suki et al. (2022), Ahmad and Yahaya (2022), and Lampo et al. (2023) which also states that EE has a positive and significant effect on INT, but in a different context.

Likewise with the third hypothesis (SI → INT), where the β value is positive (0.189), and the p-

value is less than 0.05 (0.004), it can be concluded that the third hypothesis is also accepted. INT is also influenced by family, friends, relatives, and religious leaders/ulema who influence individual decisions. The limited information and time duration given by the Indonesian government so that entrepreneurs can immediately have halal certificates encourages them to seek information from trusted sources (Anwar et al., 2024). Although technology provides benefits and convenience for Muslim entrepreneurs who want to apply for a halal certificate, the lack of information is allegedly one of the factors causing the slow development of the number of halal certificate applications in Indonesia. The requirement to obtain a halal certificate is a relatively recent regulation, and the Muslim entrepreneurs involved in this study likely lack adequate information about the application process and the requirements. Likewise, with digital media such as the website www.ptsp.halal.go.id, it is alleged that there are still many people who do not know the benefits and uses of applying for a halal certificate. In this context, social influence enhances the formation of behavioral intentions by conveying persuasive cues to consumers, thereby fostering positive attitudes and enhancing trust in the suggested options. (Yaseen et al., 2022). According to Timur et al. (2023) individuals lacking sufficient understanding of a certain technology product tend to seek further expertise or information and rely heavily on the opinions of others. In this scenario, users of digital media place greater reliance on opinions, personal experiences, and information regarding a product when it originates from trusted references (Kim & Park, 2013). However, some studies, such as Naeem (2021) suggest that in the context of technology with high complexity in its usage, individuals are more likely to trust those who possess expertise and capabilities in the technological field. Website-based digital media, such as www.ptsp.halal.go.id, is a form of technology that can be considered simple in terms of usage and accessibility. Therefore, in this study, the influence of family, friends, colleagues, and trusted individuals' opinions is sufficient to impact the intention of Muslim entrepreneurs in utilizing digital media to apply for halal certification.

An interesting thing was found in the fourth hypothesis, where FC did not encourage Muslim entrepreneurs to apply for halal certificates using digital media. It is known that the β value in the fourth hypothesis (FC → INT) is positive (0.043) but has a p-value > 0.05 (0.294), so it can be concluded that the fourth hypothesis is rejected. This means that although respondents have sufficient resources and knowledge about halal certificates or digital media, these factors are not the main drivers for using digital media in applying for halal certificates. This fact also reinforces the previous hypothesis that Muslim entrepreneurs in Indonesia trust information from family, friends, or trusted people more than the information and knowledge that the individual has. Such patterns point to the need for policy and system design that incorporate social trust mechanisms, such as peer endorsements or community-based training, rather than merely focusing on improving technical access and knowledge dissemination.

The findings were also obtained in the fifth to tenth hypotheses, where these five hypotheses tested the influence of the constructs offered by the DeLone and McLean model on US and INT to apply halal certificates using digital media. The results showed that overall, all DeLone and McLean constructs (IQ, SYQ, and SEQ) had a positive and significant effect on the US, but only SEQ partially had a positive and significant effect on INT to apply halal certificates using digital media. In the fifth hypothesis (IQ → INT), the statistical test results show that there is no significant influence between the two variables, or the fifth hypothesis is rejected (β value is positive (0.013) but with p-value > 0.05 (0.863)). Unlike the fifth hypothesis, in the sixth hypothesis (IQ → US), it is known that there is a positive and significant relationship between the constructs studied. It can be seen in the β value, which has a positive value (0.466), and the p-value, which is <0.05 (0.000). The seventh hypothesis (SYQ → INT) shows that the β value is positive (0.013) but with a p-value that is > 0.05 (0.075). So, with these results, the seventh hypothesis is rejected. In the eighth hypothesis statistical test, the derived β value is positive (0.216) with a p-value less than 0.05 (0.000). It indicates that there exists a strong and statistically significant correlation between the constructs, hence confirming the hypothesis. In the ninth hypothesis, the statistical test shows that the β value has a positive value (0.107) but with p-value <0.05 (0.028). That is, it can be concluded that the hypothesis is also accepted. The same result can also be found in the tenth hypothesis, which gets a positive β value (0.153) with p-value <0.05 (0.012). Finally, in the eleventh hypothesis, the author gets the results of the statistical test where the β value is positive (0.061) with a p-value <0.05 (0.039). So, it can be concluded that the eleventh hypothesis is also accepted.

This means that digital media users who are Muslim entrepreneurs are satisfied with the benefits, pleasure, and new experiences related to the system and the quality of information provided by digital media when applying for a halal certificate. Interestingly, the most notable findings emerge from the relationships between Information Quality (IQ) and User Satisfaction (US) (Hypothesis 6), as well as System Quality (SYQ) and US (Hypothesis 8), where IQ and SYQ are identified as the strongest

predictors of US. It indicates that digital media effectively delivers high-quality information through reliable technological systems, thereby enhancing user satisfaction. However, in this study, such satisfaction has not yet proven sufficiently strong to encourage Muslim entrepreneurs to apply for halal certificates. In contrast, SEQ is able to provide satisfaction and increase respondents' desire to use digital media. In this study, SEQ includes all services before and after using digital media in applying for halal certificates, such as assistance from halal process assistants or PPH provided by the Ministry of Religion, services obtained from customer service when users experience difficulties, and other services related to the use of digital media. In the last hypothesis, the US construct was found to have a positive and significant influence on Muslim entrepreneurs' INT to apply for a halal certificate through digital media. The US is an important element in influencing behavioral intentions. This tendency arises from the fact that users frequently draw upon prior experiences as a foundational basis for evaluating and engaging with technological applications (Haque et al., 2022; Timur et al., 2025). A high level of user satisfaction significantly increases the likelihood that Muslim entrepreneurs will utilize digital media for the halal certification application process.

3.5. Robustness Test

This study employs the nonlinearity criterion to perform robustness testing, as suggested by Sarstedt et al. (2020). Researchers typically assume linearity when calculating route models regarding the link between components. According to Hair et al. (2019). when the link between two constructs is non-linear, the effect between the two constructs is influenced by both the magnitude of change in the external construct and its value. In addition, the quadratic effects test was employed to ensure that the assumption of linearity in the proposed structural model remains acceptable. This test serves to detect the potential presence of non-linear relationships among variables within the behavioral model, which often do not strictly follow a linear pattern. This study uses a polynomial model and incorporates quadratic effects to quantify each interaction. The quadratic effect analysis reveals a non-significant interaction, indicating the resilience of the linear effect. The finding that the linear model remains valid after this test adds methodological rigor to the conclusions and enhances confidence in the generalizability of the findings, particularly in the context of complex behavioral research. (see Table.6) (Sarstedt et al., 2020).

Table 6. Output of Quadratic Effect

Construct Relationship	Standard Beta (β)	p-values	f^2
PE → INT	0.189	0.019	0.198
EE → INT	0.286	0.001	0.164
SI → INT	0.189	0.004	0.157
FC → INT	0.043	0.294	0.164
IQ → INT	0.013	0.863	0.160
IQ → US	0.466	0.000	0.322
SYQ → INT	0.126	0.075	0.180
SYQ → US	0.216	0.000	0.158
SEQ → INT	0.107	0.028	0.015
SEQ → US	0.153	0.012	0.026
US → INT	0.061	0.039	0.004
Quadratic Effect (PE → INT)	0.173	0.028	0.176
Quadratic Effect (EE → INT)	0.224	0.004	0.177
Quadratic Effect (SI → INT)	0.192	0.006	0.150
Quadratic Effect (FC → INT)	0.031	0.301	0.154
Quadratic Effect (IQ → INT)	0.027	0.900	0.160
Quadratic Effect (IQ → US)	0.289	0.000	0.300
Quadratic Effect (SYQ → INT)	0.110	0.014	0.199
Quadratic Effect (SYQ → US)	0.288	0.000	0.167
Quadratic Effect (SEQ → INT)	0.186	0.011	0.019
Quadratic Effect (SEQ → US)	0.079	0.010	0.028
Quadratic Effect (US → NT)	0.070	0.028	0.004

Notes: The quadratic effects assessed based on a two-tailed percentile bootstrapping test at a 5% confidence level [2.5%, 97.5%]; PCI: Percentile Confidence Interval

4. Conclusion

The use of digital media has proven to be an effective way to increase the intention of Muslim entrepreneurs in Indonesia to apply for halal certificates. The development of digitalization in all aspects of life has also encouraged people, especially entrepreneurs, to use digital media as a way to simplify

and speed up the process of applying for halal certificates in Indonesia. The results indicate that enhancing the quality of Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), and System Service Quality (SEQ) plays a critical role in strengthening the intention (INT) of Muslim entrepreneurs to adopt digital media for halal certification applications.

The results of the study provide an overview of the role of performance quality, benefits, convenience, social influence, and services provided to Muslim entrepreneurs in the aspect of digital media used in applying for halal certificates. Therefore, the results of this study present several managerial implications. Feature development according to user needs is highly recommended. Feature development is followed by an easy-to-use system that allows users from any background to use it. Service improvement in pre- and post-submission is very important, so the addition of halal process assistants or PPH is highly recommended to maintain the quality of service provided to Muslim entrepreneurs in Indonesia.

This study has several limitations. First, this study only accommodates respondents who come from entrepreneurs who are Muslims, whereas the obligation of halal certificates does not only apply to Muslims. Second, the respondents in this study were still centered in Java; only 19% of respondents came from outside Java. This could limit how widely the research findings apply, especially when trying to extend the results to different geographical and cultural contexts. Third, this study only included entrepreneurs who had already obtained halal certification. It may limit the study's ability to fully assess behavioral intention toward the use of digital media for halal certification, particularly among those still considering or undergoing the certification process. Therefore, in future research, the researcher recommends making non-Muslim entrepreneurs the main respondents. A multigroup analysis approach is also recommended to compare the preferences of respondents from two different groups. The same approach can also be used by comparing entrepreneur respondents from Java and those outside Java. Furthermore, future research is highly recommended to explore cross-cultural or interfaith media engagement within halal certification systems. Then, it is recommended that future research include entrepreneurs who are currently in the process of applying for or planning to apply for halal certification to capture a more comprehensive perspective on adoption intention.

CRediT Authorship Contribution Statement

Ahmad Ajib Ridlwan: Writing – Original Draft, Formal Analysis. **Yan Putra Timur:** Writing – Review & Editing, Writing – Original Draft, Formal Analysis, Methodology. **Muhammad Nafik Hadi Ryandono:** Writing – Review & Editing, Writing – Original Draft, Formal Analysis, Methodology. **Erika Takidah:** Writing – Review & Editing, Methodology. **Azreen Hamida Abdul Aziz:** Writing – Review & Editing, Methodology.

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