

Integrating Tam and Islamic Work Ethics to Explain AI Adoption in Digital Marketing of Halal Msmes in Indonesia

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ABSTRACT

Keywords:

Artificial Intelligence; Technology Acceptance Model; Islamic Work Ethics; Technology Readiness; Halal MSMEs;

Background: This study aims to analyze the factors influencing the Adoption of Artificial Intelligence (AI) in digital marketing in halal MSMEs in Indonesia. The research focuses on understanding how perceptions of Usability, Islamic work ethics, market pressures, and technological readiness shape attitudes toward adoption, which in turn influence intentions to adopt AI.

Method: The research approach is a quantitative, descriptive study involving 280 halal MSMEs active in digital marketing. The analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM) to test the direct and indirect relationships between variables, including the mediating role of attitudes towards adoption.

Results: The study found that all tested factors had a positive effect on attitudes towards AI adoption. Attitudes toward adoption have been shown to mediate the relationship between these factors and adoption intentions. These findings confirm that fostering a positive attitude is key to encouraging MSMEs' intention to adopt AI. The study's results emphasize the importance of increasing perceptions of benefits, ease of use, alignment with ethical values, responsiveness to the market, and technological readiness to drive AI adoption. Governments, technology providers, and religious institutions can support MSMEs by providing user-friendly AI training, guidance, and solutions to strengthen adoption-readiness.

Conclusion: This study contributes to the literature on technology adoption in MSMEs by integrating cultural, ethical, and market pressure factors, as well as emphasizing the role of attitude mediation in shaping AI adoption intentions in the context of halal business.

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INTRODUCTION

By 2025, the number of small and medium-sized enterprises in Indonesia is expected to surpass 66 million, accounting for about 60-61% of the country's Gross Domestic Product (GDP) (Financial Services Authority, 2025). Among these sectors, the halal MSME segment is considered one of the most promising because the majority of Indonesians are consumers of halal products. The government is also

targeting millions of MSMEs to obtain halal certification by 2025, demonstrating the sector's large scale and growth potential (UNAIR, 2025). However, despite the huge market potential, the digital transformation of halal MSMEs remains slow, especially in the adoption of innovative technologies such as Artificial Intelligence (AI) (Anwari & Hati, 2020; BRIN, 2025).

In 2025, AI adoption among Indonesian MSMEs will still be very low. Only a small fraction, estimated to be no more than 10 percent, have started using simple automation tools. In contrast, the use of advanced AI technologies, such as intelligent chatbots, machine learning-based consumer behavior analysis, and product recommendation systems, remains rare (Livikacansera, 2025). However, digital transformation is placing new pressure on halal MSMEs to adapt to changing Muslim consumer behavior, which is increasingly reliant on digital platforms for searching, evaluating, and buying halal products.

In fact, AI can play an important role in increasing the competitiveness of halal MSMEs (Riani et al., 2025). This technology can help businesses better understand market needs, make promotions more effective, provide faster customer service responses, and optimize business operations (Wunderlich et al., 2025). In the context of digital marketing, AI can be a strategic tool to strengthen the position of halal MSMEs in a highly competitive market, both from local players and international halal products. Without adopting this technology, halal MSMEs risk falling behind as markets move towards automation and data-driven strategies (Anwari & Hati, 2020).

The slow Adoption of AI by halal small- and medium-sized businesses shows that psychological, technical, and cultural factors influence business actors' decisions (Lenart et al., 2025). To understand how people are adopting technology, the Technology Acceptance Model (TAM) offers a helpful framework. Davis (1989) emphasizes that TAM is the use of technology that depends on two central beliefs: the perception of usability, which is the belief that a technology can bring benefits to the business, and the perception of ease of use, which is the belief that the technology is easy to use. These two beliefs shape business actors' attitudes towards AI, which, in turn, influence their intention to adopt it (Ha et al., 2025; Roman, 2025; Solihat et al., 2023).

However, the context of halal small and medium enterprises has unique characteristics that TAM does not fully explain. Islamic Work Ethics values often guide business decisions (Johara et al., 2023). Halal business owners tend to consider aspects such as trustworthiness, honesty, efficiency, and usability when deciding whether a technology is suitable (Mohammad et al., 2018). Technologies perceived as supporting these ethical values can foster a more positive attitude towards AI adoption. In addition to ethical values, market pressure also significantly affects the willingness of halal small- and medium-sized business owners to innovate (Su et al., 2023).

Changing consumer trends, increasing digital competition, and demands from the global halal market make AI an important tool for businesses to survive and thrive (Zamrudi & Yulianti, 2020). On the other hand, the level of technology readiness among business owners, such as digital infrastructure, technology literacy, and confidence in using new technologies, also affects their readiness to integrate AI into their business operations (Anatan & Nur, 2023; Davide et al., 2021). Although research on technology adoption among small and medium-sized businesses is extensive, it mainly focuses on e-commerce (Salah & Ayyash, 2024; Thi et al., 2025), digital payments (Nugraha et al., 2022), or social media (Meier & Peters, 2023).

Research on AI adoption, especially in the context of halal digital marketing, remains limited. Research integrating TAM (Technology Acceptance Model) with variables such as Islamic Work Ethics, market pressure, and technological readiness, especially in the context of halal MSMEs, remains very limited. Furthermore, previous research rarely places attitudes as mediators, even though attitudes are a crucial component in the adoption mechanism according to TAM. Therefore, research on the Adoption of AI in halal digital marketing for MSMEs is important. This research offers novelty by developing an adoption model that combines TAM with contextual factors specific to halal MSMEs.

METHOD

. This study was conducted in the halal small and medium enterprises (MSMEs) sector in Indonesia with a quantitative descriptive approach. The focus of this research is to understand the factors influencing the Adoption of AI in digital marketing, as well as the role of attitudes towards adoption as

a mediator between various factors and intentions to adopt technology. The population of this study comprises halal MSMEs that are actively involved in digital marketing across social media, marketplaces, and other digital channels. The selection of halal MSMEs is based on the enormous market potential, the government's push for halal certification, and the urgent need for digital transformation that is still slow in this sector.

In this study, there are seven main variables: Usability Perception (PU), Ease of Use Perception (PEOU), Islamic Work Ethics (IWE), Market Pressure (MP), Technology Readiness (TR), Attitude to Adoption (ATA), and Adoption Intention (AI). Each variable is measured by four indicators, bringing the total to 28. Based on recommendations from Hair et al. (2017), for structural equation modeling (SEM) analysis, the sample size should be 5–10 times the number of indicators. The researcher chose to multiply by 10, so that the number of respondents needed is 280. The sampling technique used is Purposive Sampling, with the following respondent criteria: halal MSME owners who have been operating for at least 1 year, are actively engaged in digital marketing through social media or marketplaces, and have at least basic technology readiness, such as internet access or digital business applications.

Researchers conducted a pilot test before distributing the questionnaire to 30 halal MSME respondents. The statement items submitted to MSME actors were deemed valid and reliable if they met the validity and reliability criteria. The questionnaire is distributed via Google Forms and then promoted via Instagram ads. Instagram ads aim to expand respondents' reach and ensure the questionnaire reaches the target population, as defined by the criteria, through Targeted Advertising (Putra et al., 2025). The measurement scale for the statement items ranges from 1 (strongly disagree) to 5 (strongly agree).

To test the research hypothesis, this study uses the Partial Least Squares Structural Equation Modeling (PLS-SEM). Table 1 outlines the latent variables and their respective indicators. Data analysis was carried out using SmartPLS 3.0. Model evaluation consists of two stages, namely: (1) Evaluation of the measurement model (outer model) to assess the reliability of the indicator, construct validity, and AVE value; and (2) Evaluation of structural models (inner models) to test path coefficients, collinearity, R^2 , f^2 , and Q^2 values as a measure of predictive relevance (Hair et al., 2017).

Table 1: Variables, Indicators and Research Sources

Variable	Indicators	Source
Perceived Usefulness (PU)	Increase effectiveness	(Al-Adwan et al., 2023; Davis, 1989; Enshassi et al., 2025)
	Increase efficiency	
	Increase productivity	
	Business relevance	
Perceived Ease of Use (PEOU)	Ease of learning	(Al-Adwan et al., 2023; Davis, 1989; Denovan & Marsasi, 2025)
	Ease of use	
	Clarity of function	
	Reduced workload	
Islamic Work Ethics (IWE)	Work as worship	(Alsmadi & Omoush, 2025; Johara et al., 2023; Mohammad et al., 2018)
	The Value of Honesty	
	Justice in business	
	Productivity is of Islamic value.	
Market Pressure (MP)	Competitor pressure	(Ayinaddis, 2025; Popa et al., 2025; Su et al., 2023)
	Consumer pressure	
	Market trend pressure	
	The Competitiveness of Efforts	
Technology Readiness (TR)	Optimism	(Anatan & Nur, 2023; Davide et al., 2021; Su et al., 2023)
	Innovative	
	Technical competence	
	Availability of resources	
Attitude Toward Adoption (ATA)	Positive Attitude	(Davis, 1989; Gupta et al., 2022; Hussein, 2017)
	Belief	
	Comfort	
	Value conformity	

Adoption Intention (AI)	Intention to adopt	(Al-Adwan et al., 2023; Popa et al., 2025; Roman, 2025)
	Plan of use	
	Adoption seriousness	
	Commitment	

Model Development

This research framework was developed by adapting and expanding the findings of Davis (1989) and Mohammad et al. (2018). Davis (1989) research presents the TAM, which explains how Perceived Usability and Perceived Ease of Use shape attitudes toward technology. Mohammad et al. (2018), focusing on the role of Islamic Work Ethics in forming positive attitudes in the context of halal business. The model is expanded by adding Market Pressure, Technology Readiness, and a focus on AI adoption in digital marketing, enabling a comprehensive explanation of how attitudes and intentions to adopt AI are evolving among halal small- and medium-sized businesses.

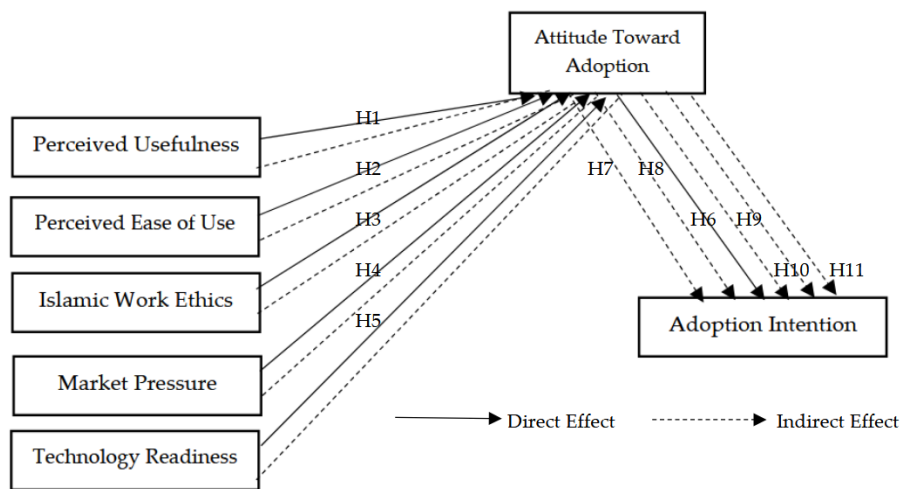


Figure 1: Research Model

RESULTS AND DISCUSSION

Results

Demographic Analysis of Respondents

Analysis of respondent demographic data plays a crucial role in a study because it provides a clear picture of the characteristics of the respondents or the sample. Demographic data are presented in a table showing the distribution of respondents. These characteristics are based on six respondent demographics: province of domicile, gender, age, education, type of halal MSME, and type of Halal Certification used.

By province of domicile, the most respondents came from East Java, with 21 people (7.5%), making it the region with the highest participation in the questionnaire. Female respondents were the largest group, which was 169 people (60.36%). By age, the most respondents were between 26 and 35 years old, with 125 people (44.64%). In terms of education, undergraduate graduates (S1) are the most, namely 103 people (36.79%). The most common type of micro, small, and medium enterprise is in the food and beverage sector, with 146 people (52.14%). Regarding halal certification, most respondents used the self-declaration scheme (176 people, 62.86%).

Table 2: Respondent Data Results

Characteristic	Frequency	Percentage (%)
Domicile		
Aceh	12	4,29

Bali	7	2,5
Banten	14	5
Bangka Belitung	6	2,14
Bengkulu	11	3,93
Central Java	12	4,29
Central Kalimantan	4	1,43
Central Sulawesi	6	2,14
East Java	21	7,5
East Kalimantan	5	1,79
East Nusa Tenggara	5	1,79
Gorontalo	4	1,43
Jambi	6	2,14
Lampung	14	5
Maluku	3	1,07
North Kalimantan	2	0,71
North Maluku	3	1,07
North Sulawesi	7	2,5
North Sumatera	14	5
Papua	3	1,07
Riau	6	2,14
Riau Islands	5	1,79
Special Capital Region of Jakarta	17	6,07
Special Region of Yogyakarta	16	5,71
South Kalimantan	8	2,86
South Sulawesi	2	0,71
South Sumatera	15	5,36
Southeast Sulawesi	3	1,07
West Java	13	4,64
West Kalimantan	6	2,14
West Nusa Tenggara	4	1,43
West Papua	5	1,79
West Sulawesi	5	1,79
West Sumatera	16	5,71
Total	280	100
Gender		
Man	111	39,64
Woman	169	60,36
Total	280	100
Age		
18 – 25	46	16,43
26 – 35	125	44,64
36 – 45	88	31,43
> 46	21	7,50
Total	280	100,00
Education		
High School/Equivalent	89	31,79
Bachelor	103	36,79
Master	42	15,00
Doctor	14	5,00
Other	32	11,43
Total	280	100
Types of Halal MSMEs		
Food and beverage	146	52,14
Fashion and Crafts	34	12,14

Cosmetics	22	7,86
Agribusiness or agriculture	18	6,43
Other	60	21,43
Total	280	100
Types of Halal Certification		
Self-declaration	176	62,86
Regular certification from BPJPH	104	37,14
Total	280	100

Measurement Model Analysis (Outer Model)

The external measurement model used in this study aims to explain the relationship between the indicators and their theoretical constructs (Razak et al., 2024). Partial Least Squares (PLS) path modeling was used to assess the quality of the research instruments, including reliability and validity indicators such as Cronbach's alpha, Composite Reliability (CR), Mean Variance Extraction (AVE), and convergent and discriminant validity. All constructs in the model show excellent reliability, with Cronbach's alpha values ranging from 0.932 to 0.961 and CR values between 0.952 and 0.972. According to Hair et al. (2014), values higher than 0.70 indicate strong construct reliability, so that all research variables meet the required standards.

Convergent validity was assessed using indicator loadings and AVEs. AVE values ranged from 0.831 to 0.893. Based on the literature criteria, the outer loading must be greater than 0.70, and the AVE must be greater than 0.50 (Ascarya & Tekdogan, 2022); all indicators can be considered valid with respect to convergence. This shows that each indicator reflects its construct very well.

Overall, the test results indicate that the research instrument is reliable and valid, with each construct meeting the PLS-SEM criteria. No problematic indicators were found, so all questionnaire items are feasible for use in further structural analysis.

Table 3: Measurement Model Results

Variable	Code	Loadings	Weight
Perceived Usefulness ($\alpha=0.932$, CR= 0.952, and AVE= 0.831)			
The use of AI will help my business market halal products more effectively	PU.1	0,908	0,262
AI can save time and effort in my business's digital marketing activities	PU.2	0,925	0,269
AI can help improve the sales and competitiveness of my halal products	PU.3	0,915	0,282
I believe AI is relevant for the development of my halal business	PU.4	0,897	0,284
Perceived Ease of Use ($\alpha=0.942$, CR= 0.959, and AVE= 0.868)			
I find AI easy to learn to use in digital marketing	PEOU.1	0,895	0,266
I find it difficult to use AI to promote halal products	PEOU.2	0,923	0,268
The AI features are clear and easy to understand for me	PEOU.3	0,938	0,275
Using AI can reduce the difficulty of managing my online marketing business.	PEOU.4	0,942	0,272
Islamic Work Ethics ($\alpha=0.960$, CR= 0.971, and AVE= 0.892)			
I consider the use of technology, including AI, in halal business to be part of worship if done correctly	IWE.1	0,933	0,258
I will only use AI for honest promotions and not mislead consumers	IWE.2	0,952	0,266
I believe AI should be used to provide fair benefits, not harm others	IWE.3	0,944	0,267
I maximize the use of AI so that my halal business is more beneficial to the community	IWE.4	0,949	0,269

Market Pressure ($\alpha=0.949$, CR= 0.963, and AVE= 0.867)			
I saw my halal business competitors start using AI for marketing	MP.1	0,933	0,286
My customers expect faster and more personalized service, which prompted me to consider AI	MP.2	0,944	0,265
The development of the digital market requires me to keep up with AI technology	MP.3	0,923	0,254
If I do not use AI, my business can lose competition with other halal MSMEs	MP.4	0,924	0,269
Technology Readiness ($\alpha=0.958$, CR= 0.970, and AVE= 0.889)			
I believe AI can have a positive impact on my halal business	TR.1	0,944	0,264
I am excited to try new technologies such as AI to support businesses	TR.2	0,951	0,265
I feel capable enough to operate digital technologies, including AI	TR.3	0,944	0,258
My business has enough resources (time, funds, and HR) to start using AI	TR.4	0,933	0,273
Attitude Toward Adoption ($\alpha=0.961$, CR= 0.972, and AVE= 0.893)			
I have a positive view of the use of AI in digital marketing	ATA.1	0,948	0,269
I believe the use of AI will help my halal business grow	ATA.2	0,947	0,264
I feel comfortable with the idea of using AI in my business	ATA.3	0,952	0,266
I believe AI can be used without contradicting Islamic values	ATA.4	0,903	0,259
Adoption Intention ($\alpha=0.959$, CR= 0.967, and AVE= 0.879)			
I intend to use AI in my halal business marketing activities	AI.1	0,948	0,276
I plan to integrate AI into my digital marketing strategy in the near future	AI.2	0,947	0,269
I seriously consider AI as part of my halal business	AI.3	0,952	0,271
I am committed to adopting AI as soon as there is an adequate opportunity and resources	AI.4	0,903	0,249

The test results in Table 4 show that all the mean variances of the square root (shown on the diagonal) are in the range of 0.911 to 0.959, and all of them are higher than the correlation between each construct and the other constructs. For example, the average square root variance for Adoption Intent is 0.938, which is still higher than its correlations with other constructs, such as Market Pressure (0.934) and Attitude to Adoption (0.921). A similar pattern is observed in other constructs, such as Perceived Usability, which has a diagonal value of 0.911, higher than all its correlations, and Technology Readiness, which has a diagonal value of 0.943, also higher than all its correlations. Therefore, all constructs in the model demonstrate good discriminant validity according to the Fornell-Larcker criterion, indicating that each construct has conceptual uniqueness and no overlap among the model's variables (Hair et al., 2014).

Table 4: Fornell-Larcker Criterion Results

	Y2	Y1	X3	X4	X2	X1	X5
Adoption Intention	0,938						
Attitude Toward Adoption	0,921	0,945					
Islamic Work Ethics	0,906	0,914	0,944				
Market Pressure	0,934	0,956	0,951	0,931			
Perceived Ease of Use	0,883	0,882	0,907	0,916	0,924		

Perceived Usefulness	0,911	0,929	0,947	0,939	0,954	0,911	
Technology Readiness	0,890	0,930	0,959	0,939	0,900	0,938	0,943

Structural Model Analysis (Inner Model)

The purpose of the structural model (inner model) is to assess the causal relationship between latent constructs in a research framework. To measure the strength of the correlation between constructs and the magnitude of the variance explained by the endogenous variable, the Partial Least Squares (PLS) algorithm is used (Razak et al., 2024). Furthermore, the model's relevance and significance were evaluated using the Resampling Bootstrap. Using Smart PLS 3, structural models are used to evaluate direct and indirect effects.

The hypotheses presented in Table 5 and illustrated in Figure 2 have all been confirmed, as indicated by the positive, significant levels that meet the criteria of $P < 0.05$ or $T > 1.96$, as per the guidelines of Ascarya & Indra (2022). The test results showed that the exogenous variables Perceived Usefulness, Perceived Ease of Use, Islamic Work Ethics, Market Pressure, and Technology Readiness each had a significant impact on Attitude Toward Adoption. These findings highlight that factors such as perceptions, Islamic work ethics, market pressures, and technological readiness shape business actors' attitudes towards AI adoption. In addition, Attitude Toward Adoption was found to have a positive and powerful influence on Adoption Intention, making Attitude an important mediator in encouraging MSME halal business actors to adopt AI technology.

Therefore, all causal relationships in the model—either $X1 \rightarrow Y1$, $X2 \rightarrow Y1$, $X3 \rightarrow Y1$, $X4 \rightarrow Y1$, $X5 \rightarrow Y1$, or $Y1 \rightarrow Y2$ —were positive and accepted. These results reinforce the idea that AI adoption among halal MSMEs is strongly influenced by perceived benefits, ease of use, Islamic ethical considerations, competitive pressures, and technological readiness, which in turn lead to positive attitudes and ultimately strong intentions to adopt the technology.

Table 5: Direct Contact Results

Hypothesis	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values	Accepted
X1 -> Y1	0,455	0,452	0,103	4,405	0,000	Yes
X2 -> Y1	-0,232	-0,225	0,077	3,033	0,003	Yes
X3 -> Y1	-0,339	-0,338	0,090	3,762	0,000	Yes
X4 -> Y1	0,767	0,768	0,078	9,823	0,000	Yes
X5 -> Y1	0,317	0,311	0,084	3,767	0,000	Yes
Y1 -> Y2	0,921	0,921	0,012	79,000	0,000	Yes

Indirect relationships were assessed using PLS-SEM bootstrapping, following the procedures outlined by Hair et al. (2010). The results shown in Table 6 validate the H7 and H11 Hypotheses ($P < 0.05$ or $T > 1.96$). These findings show that Attitude Toward Adoption functions as a mediating factor in the relationships between Perceived Usefulness, Perceived Ease of Use, Islamic Work Ethics, Market Pressure, and Technology Readiness, and the Adoption Intention of halal MSMEs in Indonesia. Statement in accordance with $X1 \rightarrow Y1 \rightarrow Y2$, $X2 \rightarrow Y1 \rightarrow Y2$, $X3 \rightarrow Y1 \rightarrow Y2$, $X4 \rightarrow Y1 \rightarrow Y2$, $X5 \rightarrow Y1 \rightarrow Y2$ T Values > 1.96 and P-Values < 0.05 with hypothetical results accepted.

Table 6: Indirect Relationship Results

Hypothesis	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values	Accepted
X1 -> Y1-> Y2	0,419	0,416	0,093	4,490	0,000	Yes
X2 -> Y1-> Y2	-0,214	-0,207	0,070	3,066	0,002	Yes
X3 -> Y1-> Y2	-0,312	-0,311	0,084	3,737	0,000	Yes
X4 -> Y1-> Y2	0,706	0,708	0,073	9,637	0,000	Yes
X5 -> Y1-> Y2	0,292	0,287	0,078	3,726	0,000	Yes

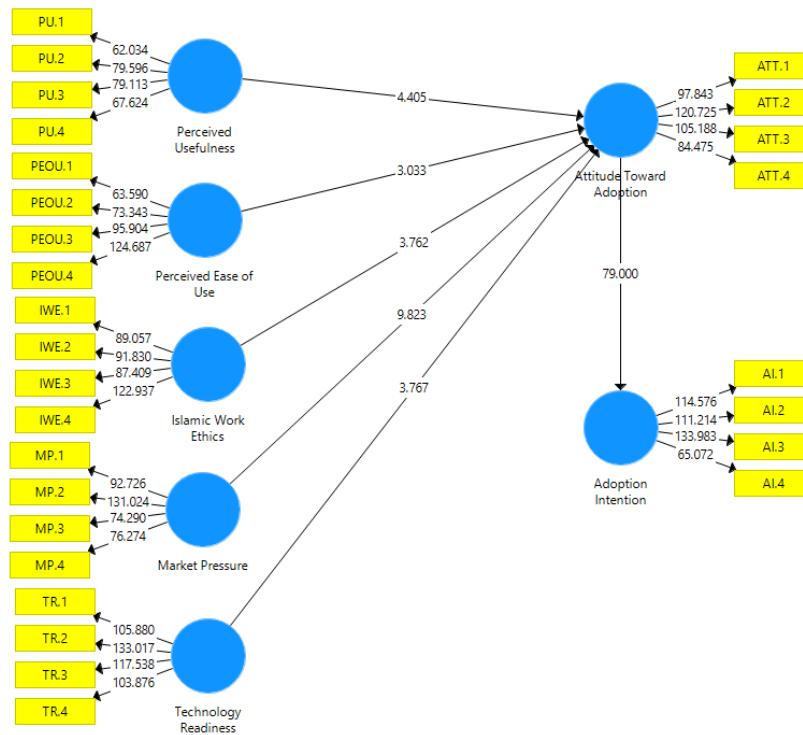


Figure 2: Research Model Results

Table 7 presents the R-Square and Adjusted R-Square values, which reflect the extent to which exogenous variables explain changes in endogenous variables. Perceived Usefulness, Perceived Ease of Use, Islamic Work Ethics, Market Pressure, and Technology Readiness explain 93.6% of the Attitude Toward Adoption of halal MSMEs. Similarly, Attitude Toward Adoption explains 84.9% of halal MSME Adoption Intention in Indonesia. Value Adjusted R-Square, all of which exceed 0.50, exhibit strong predictive power (Harahap et al., 2023).

Table 7: R-Square and Adjusted R-Square Value Results

Variable	R-Square	Adjusted R-Square
Attitude Toward Adoption	0,936	0,935
Adoption Intention	0,849	0,848

On the other hand, Table eight shows the effect size and the model's predictive relevance. To assess the strength of the relationship between variables, the F-Square Cohen value is used, with 0.02 (low), 0.15 (medium), and 0.35 (high) indicating its magnitude (Hair et al., 2023). The square value is between 0.036 and 0.746. Furthermore, predictive relevance is assessed using Stone–Geisser's Q-square. This Q-squared value reflects how well the exogenous variable predicts the endogenous variable (Ascarya & Indra, 2022). The Q-squared value is between 0.319 and 0.578, exceeding the required minimum threshold of > 0. This suggests that the model effectively reproduces the observed data, which confirms its predictive relevance. The overall VIF value < 0.05 indicates no multicollinearity, as reported by Harahap et al. (2023).

Table 8: Effect Size and Multicollinearity Results

Variable	f-Square	Q-Square	VIF
X1 -> Y1	0,160	0,319	4,337
X2 -> Y1	0,073	0,456	3,994
X3 -> Y1	0,095	0,437	3,070
X4 -> Y1	0,682	0,578	4,163
X5 -> Y1	0,108	0,498	4,760
Y1 -> Y2	5,611	0,327	4,966

Discussions

The study's results showed that all hypotheses, both directly and indirectly, were positively confirmed. These findings highlight that the Adoption of AI by halal MSME actors in Indonesia does not occur in isolation but is shaped by the interaction of several factors: perceptions of usability and ease of use, Islamic ethical values, market pressure, and technological readiness. Together, these factors shape positive attitudes, which, in turn, influence the intention to adopt AI.

Perception of Usability had a positive effect on Attitude towards Adoption, with a value of 0.455 and a T-statistic of 4.405. These findings show that the higher halal MSME actors' perception is that AI technology can increase the effectiveness, efficiency, and productivity of digital marketing, the more positive their Attitude towards the use of AI will be. In other words, the immediate benefits they experience encourage positive evaluations of this technology's use in daily business activities. These results are consistent with research by Tamilmani et al. (2021) and Enshassi et al. (2025), which state that perceived usability is the strongest factor in shaping attitudes towards the adoption of new technologies, especially in the context of digital marketing.

Perception of Ease of Use had a positive effect on Attitudes towards Adoption, with the original sample value of -0.232 and the T-statistic of 3.033. These findings show that the easier it is for halal MSME actors to use AI in digital marketing activities, such as automated campaign setup, customer analytics, and chatbots, the more positive their Attitude towards adopting the technology will be. This means that ease of use reduces the mental burden and increases the comfort of MSME actors in operating AI, resulting in a more positive evaluation of technology adoption (Suder, 2024). These results are in line with research by Denovan & Marsasi (2025) and Enshassi et al. (2025), which states that ease of use is an important factor in forming a positive attitude towards new technologies. Moreover, Stuart & Stuart (2024) found that MSME owners are more likely to accept AI when its features can be used without technical difficulties.

Islamic Work Ethics also had a positive effect on Attitudes towards Adoption, with an original sample value of -0.339 and a T-statistic of 3.762. These findings show that the higher the level of Islamic work ethics applied by halal MSME actors, such as honesty, responsibility, professionalism, and motivation to use technology for a wider benefit, the more positive their Attitude towards the use of AI in digital marketing will be. This means that ethical values based on Islamic principles encourage a positive evaluation of technology seen as able to improve efficiency, transparency, and the quality of business services. These results are consistent with the findings of Johara et al. (2023) and Alsmadi & Omoush (2025), which emphasize that individuals with a high Islamic work ethic are more likely to accept technological innovation as a means to increase productivity and business success. Research by Mohammad et al. (2018) also shows that business actors who practice Islamic values in their work activities are more motivated to use technology responsibly and beneficially.

Market pressures have been shown to have a positive impact on attitudes towards adoption, with an original sample value of 0.767 and a T-statistic of 9.823. These findings show that the greater the market pressure felt by small and medium-sized halal businesses, such as competition from competitors, changing consumer behavior, and dynamic market demand, the more positive their Attitude towards the use of AI in digital marketing will be. In other words, external market pressures encourage business owners to evaluate technology as a strategic solution to improve operational efficiency, expand market reach, and enhance the customer experience. These results are consistent with previous research that highlights that market pressures are a significant driver for the adoption of digital innovation among small and medium-sized businesses (Ayinaddis, 2025; Su et al., 2023).

Technology readiness was also found to have a positive effect on adoption attitudes, with the original sample value of 0.317 and the T-statistic of 3.767. These results emphasize that the higher the readiness of halal MSMEs in halal MSME technology, including mental readiness, skills, and knowledge in using digital systems, the more positive their Attitude towards the Adoption of AI in digital marketing will be. This means that MSMEs that feel ready to embrace new technologies tend to be more confident, adapt faster, and better identify the benefits of AI in their business operations (Suder, 2024; Wadood et al., 2022). These findings are in line with previous studies that have stated that technology readiness is a crucial factor in shaping positive attitudes towards technology adoption, especially among small businesses that need efficiency, personalized marketing, and faster decision-making (Anatan & Nur, 2023; Davide et al., 2021; Sánchez et al., 2025).

The analysis showed that Attitude Toward Adoption had a positive effect on Adoption Intention, with an original sample value of 0.921 and a T-statistic of 79,000. These findings show that the more positive the Attitude of halal MSME actors towards AI in digital marketing, the stronger their intention to adopt it. This aligns with the views of Hussein (2017), Gupta et al. (2022), and Lee et al. (2025), who argue that attitudes are a key predictor of adoption intentions in the TAM model. In practice, halal MSMEs that view AI as practical, easy to use, and in line with ethical values tend to integrate it into their digital marketing strategies. A positive attitude is the primary driver of adoption intention and reflects businesspeople's psychological readiness to adopt new technologies.

The mediation analysis showed that Attitude Toward Adoption mediated the influence of Perceived Usefulness on Adoption Intention, with an original sample value of 0.419 and a T-statistic of 4.490. This means that the perceived usefulness of AI, such as increased productivity and effectiveness in digital marketing, only drives adoption intentions if MSMEs' attitudes towards AI are positive. Previous studies by Chen et al. (2024) and Tamilmani et al. (2021) support this, suggesting that PU is a precursor factor, while attitudes serve as the primary psychological pathway linking the benefits of technology to adoption intentions. Therefore, increasing the perceived usefulness of AI through training or demonstration can reinforce positive attitudes and thereby increase adoption intentions.

The analysis showed a positive mediating effect of Attitude Toward on the relationship between Perceived Ease of Use and Intention of Adoption. The initial sample value was -0.214, and the T-statistic was 3.066. These findings suggest that the ease of use of AI, including automation, chatbots, and easily accessible customer analytics, helps form positive attitudes, which in turn increase the intention to adopt AI. Previous research by Stuart & Stuart (2024) and Romance (2025) supports these findings, which state that ease of use is a key factor in shaping supportive attitudes towards digital technology. In other words, business owners are more likely to adopt AI if they feel comfortable and confident using it.

The mediation results also showed that Attitude Toward Adoption mediated the influence of Islamic Work Ethics on Adoption Intention, with an original sample value of -0.312 and a T-statistic of 3.737. These findings suggest that Islamic work ethic values, such as honesty, responsibility, and professionalism, lead to positive attitudes towards AI, which, in turn, increase the intention to adopt the technology. These findings align with Mohammad et al. (2018), who found that individuals with a strong Islamic work ethic tend to view technology as a means to increase productivity and business success. This means IWE influences the intention to adopt AI through the formation of positive attitudes as a psychological mechanism.

The mediation analysis showed that Attitude Toward Adoption partially mediated the influence of Market Pressure on Adoption Intention, with an original sample effect size of 0.706 and a T-statistic of 9.637. This confirms that competitive pressures and digital market dynamics are driving positive attitudes towards AI, which, in turn, increase the intention to adopt the technology. Previous research by Faiz et al. (2024) and Ayinaddis (2025) supports these findings, showing that small business owners facing digital competition are more open to innovations that improve efficiency and customer experience. Therefore, market pressure is driving the Adoption of AI through psychological attitudes.

The analysis also showed that Attitude Toward Adoption mediated the effect of Technology Readiness on Adoption Intention, with an original sample value of 0.292 and a T-statistic of 3.726. These findings suggest that technology readiness, including digital skills, confidence, and organizational readiness, drives positive attitudes towards AI, which in turn increases the intention to adopt it. Research by Davide et al. (2021) and Sánchez et al. (2025). In line with these findings, which emphasize that businesses that are better prepared technologically are better able to foster positive attitudes and use digital technology effectively.

CONCLUSION

The study's findings show that all causal relationships in the structural models are significant, either directly or indirectly. Usability Perception, Ease of Use Perception, Islamic Work Ethics, Market Pressure, and Technology Readiness all influence halal MSME actors' attitudes towards AI adoption, which in turn has a substantial impact on their intention to adopt AI. In addition, all independent variables indirectly influence attitudes, making attitudes the central mediators that explain how perceptions, values, market pressure, and technological readiness lead to the decision to adopt AI. These

findings show that adopting technology among halal MSMEs does not occur instantly, but rather through evaluation and the formation of attitudes influenced by internal and external factors of business actors.

REFERENCES

- Al-Adwan, A. S., Li, N., Al-Adwan, A., Abbasi, G. A., Albelbisi, N. A., & Habibi, A. (2023). "Extending the Technology Acceptance Model (TAM) to Predict University Students ' Intentions to Use Metaverse- Based Learning Platforms ". *Education and Information Technologies*, 28, 15381–15413.
- Alsmadi, A. A., & Omoush, ; Khaled Saleh Al. (2025). Adoption of Islamic Fintech: exploring influential factors and the mediating role of Islamic work ethics. *EuroMed Journal of Business*, 1–26.
- Anatan, L., & Nur. (2023). Micro, Small, and Medium Enterprises ' Readiness for Digital Transformation in Indonesia. *Economies*, 11(156).
- Anwari, M., & Hati, S. R. H. (2020). Analysis of Motivational Factors Of MSMEs Entrepreneurs to Be Halalpreneurs. *International Journal of Business and Society*, 21(3), 1122–1138.
- Ascarya, A., & Indra. (2022). Standard methodology for research in Islamic economics and finance (Chapter 17). In Billah, M.M (Ed), *Teaching and research methods for Islamic economics and finance*. Routledge: Abingdon-on-Thames, England, UK.
- Ascarya, & Tekdogan, O. F. (2022). Recommended methodology for research in Islamic economics and finance. In *Teaching and Research Methods for Islamic Economics and Finance*. Routledge 2 Park Square, Milton Park, Abingdon, 605 Third Avenue, New York. <https://doi.org/10.4324/9781003252764>
- Ayinaddis, S. G. (2025). Artificial intelligence adoption dynamics and knowledge in SMEs and large firms : A systematic review and bibliometric analysis. *Journal of Innovation & Knowledge*, 10(3), 100682. <https://doi.org/10.1016/j.jik.2025.100682>
- BRIN. (2025). BRIN Soroti Rendahnya Adopsi Teknologi Digital oleh UMKM Indonesia. <https://Brin.Go.Id/>.
- Chen, B., Chang, Y., Wang, B., Zou, J., & Tu, S. (2024). Technology acceptance model perspective on the intention to participate in medical talents training in China. *Heliyon*, 10(4), e26206. <https://doi.org/10.1016/j.heliyon.2024.e26206>
- Davide, B., Carpanzano, E., & Bettoni, A. (2021). An AI adoption model for SMEs: a conceptual framework. *IFAC PapersOnLine*, 54(1), 702–708. <https://doi.org/10.1016/j.ifacol.2021.08.082>
- Davis, F. D. (1989). Perceived Usefulness , Perceived Ease of Use , and User Acceptance of Information Technology. *MIS Quarterly*, January. <https://doi.org/10.2307/249008>
- Denovan, R. F., & Marsasi, E. G. (2025). Perceived Ease Of Use, Perceived Usefulness and Satisfaction To Maximize Behavioral Intention With The Technology Acceptance Model in Generation Y And Z Consumers. *Jurnal Pamator*, 18(1), 1–36.
- Enshassi, M., Jeyakumar, R., & Ismail, H. (2025). Unveiling barriers and drivers of AI adoption for digital marketing in Malaysian SMEs. *Journal of Open Innovation: Technology, Market, and Complexity*, 11(2), 100519. <https://doi.org/10.1016/j.joitmc.2025.100519>
- Faiz, F., Le, V., & Masli, E. K. (2024). Determinants of digital technology adoption in innovative SMEs. *Journal of Innovation & Knowledge*, 9(November).
- Gupta, S., Abbas, A. F., & Srivastava, R. (2022). Technology Acceptance Model (TAM): A Bibliometric Analysis from Inception. *Journal of Telecommunications and the Digital Economy*, 10(3).
- Ha, S. T., Thanh, T., Phan, H., Viet, T., & Ngo, N. (2025). Integrating artificial intelligence competencies into the theory of planned behavior : Explaining sustainability-oriented entrepreneurial intentions. *Journal of Entrepreneurship, Management and Innovation*, 21(4), 30–53.
- Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (2010). *Multivariate data analysis (7th ed)*. Englewood Cliff NJ: Prentice Hall.

- Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2017). A primer on partial least squares structural equation modeling (PLS-SEM) (p. 165). Thousand Oaks: Sage.
- Hair, J. F., Sarstedt, M., Hopkins, L., & Kuppelwiesier, V. G. (2014). Partial Least Squares Structural Equation Modeling (PLS-SEM) An Emerging Tool in Business Research. *European Business Review*, 26(2), 106–121.
- Hair, J., F. S., M Ringle, C. M., & Gudergan, S. P. (2023). *Advanced issues in partial least squares structural equation modeling*. Sage Publications, 6(May), 297.
- Harahap, D., Afandi, A., & Siregar, T. M. (2023). the Islamic Banking Customers' Intention To Use Digital Banking Services: an Indonesian Study. *Journal of Islamic Monetary Economics and Finance*, 9(3), 533–558. <https://doi.org/10.21098/jimf.v9i3.1673>
- Hussein, Z. (2017). Leading to Intention: The Role of Attitude in Relation to Technology Acceptance Model in E-Learning. *Procedia - Procedia Computer Science*, 105(December 2016), 159–164. <https://doi.org/10.1016/j.procs.2017.01.196>
- Johara, F., Mustafa, R., Hassan, M. K., & Azad, M. A. K. (2023). A Bibliometric Review of Islamic Work Ethics Literature. *Journal of Economic Cooperation and Development*, 3, 91–127.
- Lee, A. T., Ramasamy, R. K., & Subbarao, A. (2025). Understanding Psychosocial Barriers to Healthcare Technology Adoption : A Review of TAM Technology Acceptance Model and Unified Theory of Acceptance and Use of Technology and UTAUT Frameworks. *Healthcare*, 13.
- Lenart, R., Sypniewska, B. A., Chen, J., & Janowski, K. (2025). Antecedents of students ' behavioural intention to use generative artificial intelligence : Quantitative research. *Entrepreneurial Business and Economics Review*, 13(1).
- Livikacansera, S. (2025). Mengapa UMKM Indonesia masih enggan mengadopsi AI? <https://Id.Techinasia.Com/>.
- Meier, A., & Peters, M. (2023). Information & Management Limited engagement of SMEs with social media : A structuration and sensemaking perspective. *Information & Management*, 60(7), 103853. <https://doi.org/10.1016/j.im.2023.103853>
- Mohammad, J., Quoquab, F., & Idris, F. (2018). The relationship between Islamic work ethic and workplace outcome: A partial least squares approach Article information: Emerald, June. <https://doi.org/10.1108/PR-05-2017-0138>
- Nugraha, D. P., Setiawan, B., Nathan, R. J., & Farkas, M. F. (2022). Fintech Adoption Drivers for Innovation for SMEs in Indonesia. *Journal of Open Innovation: Technology, Market, and Complexity*, 8(4), 208. <https://doi.org/10.3390/joitmc8040208>
- Otoritas Jasa Keuangan. (2025). *UMKM Mendunia: Strategi Peningkatan Skala Bisnis Menembus Pasar Nasional dan Internasional*. <https://Institute.Ojk.Go.Id/>.
- Popa, R. C., Ionut, C. P., Ciocodeică, D.-F., & Mihălcescu, H. (2025). Modeling AI Adoption in SMEs for Sustainable Innovation : A PLS-SEM Approach Integrating TAM , UTAUT2 , and Contextual Drivers. *Sustainability*, 17(6901).
- Putra, E. Y., Khesi, K., Purwianti, L., & Anggraini, R. (2025). the Impact of Influencer Interactivity on Local Skincare Purchase Intention in Batam City With Trust As Mediation. *Jurnal Ekonomi Bisnis Dan Kewirausahaan*, 13(3), 339–363. <https://doi.org/10.26418/jebik.v13i3.82136>
- Razak, S., Nasuka, M., Syahabuddin, Arsyad, K., & Darwis, M. (2024). Strengthening Zakah Compliance Among Indonesian Muslims Through the Role Ofinstitutional Capabilities. *Journal of Islamic Monetary Economics and Finance*, 10(3), 497–520. <https://doi.org/10.21098/jimf.v10i3.2081>
- Riani, R., Ikhwan, I., & Rusydiana, A. S. (2025). Integrating technological innovation in the halal industry: An analysis using PRISMA. *Jurnal Ekonomi & Keuangan Islam*, 11(1), 61–79. <https://doi.org/10.20885/JEKI.vol11.iss1.art5>
- Roman, T. (2025). Determinans of AI Adoption Intention in SMEs: Romanian Case Study. *Journal of Business Economics & Management*, 26(2), 277–296.

- Salah, O. H., & Ayyash, M. M. (2024). E-commerce adoption by SMEs and its effect on marketing performance: An extended of TOE framework with ai integration , innovation culture , and customer tech-savviness. *Journal of Open Innovation: Technology, Market, and Complexity*, 10(1), 100183. <https://doi.org/10.1016/j.joitmc.2023.100183>
- Sánchez, E., Calderón, R., & Herrera, F. (2025). Artificial Intelligence Adoption in SMEs : Survey Based on TOE – DOI Framework , Primary Methodology and Challenges. *Applied Sciences*, 15, 1–43.
- Santosa, A. D., & Surgawati, I. (2024). Artificial Intelligence (AI) Adoption as Marketing Tools among Micro , Small , and Medium Enterprises (MSMEs) in Indonesia. *Jurnal Sosial Humaniora (JSH)*, 17, 91–102.
- Solihat, I., Hamundu, F. M., & Wahyu, M. (2023). Determinants of Behavior Intention to Adopt Peer-To-Peer Lending Services Among Indonesia. *International Journal of Business and Society*, 24(1), 543–558.
- Su, J., Zhang, Y., & Wu, X. (2023). How market pressures and organizational readiness drive digital marketing adoption strategies' evolution in small and medium enterprises. *Technological Forecasting and Social Change*, 193.
- Suder, M. (2024). Entrepreneurial (re)orientation in the face of crisis: Is it worth modifying entrepreneurial strategy? *Journal of Entrepreneurship, Management and Innovation*, 20(2), 9–35.
- Tamilmani, K., Rana, N. P., & Dwivedi, Y. K. (2021). Consumer Acceptance and Use of Information Technology : A Meta-Analytic Evaluation of UTAUT2. *Information Systems Frontiers*, 23, 987–1005.
- Thi, N., Giang, P., Tan, T. D., Thi, L., & Nhung, H. (2025). Determinants of E-commerce adoption and its effect on marketing performance among Vietnamese SMEs : An PLS-SEM approach using the TOE framework. *Journal of Open Innovation : Technology , Market , and Complexity*, 11(June).
- UNAIR. (2025). Peran Pemerintah dalam Meningkatkan Industri Halal Nasional. <https://Halal.Unair.Ac.Id/>.
- Wadood, F., Alshaikh, M. E., Akbar, F., & Mahmud, M. (2022). Adoption of open innovation and entrepreneurial orientation practices in Malaysian furniture industry. *Entrepreneurial Business and Economics Review*, 10(2), 21–40.
- Wunderlich, N. V., Blut, M., Brock, C., Heirati, N., Jensen, M., Paluch, S., & Julia, R. (2025). How to use emerging service technologies to enhance customer centricity in business-to-business contexts : A conceptual framework and research agenda. *Journal of Business Research*, 192(January). <https://doi.org/10.1016/j.jbusres.2025.115284>
- Zamrudi, Z., & Yulianti, F. (2020). Sculpting Factors of Entrepreneurship among University Students in Indonesia. *Entrepreneurial Business and Economics Review*, 8(1), 33–49.