

# Artificial Intelligence in Halal Business: An Analysis of Muslim Consumer Trust and Ethical Concerns

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**Abstract:** The rapid development of Artificial Intelligence (AI) has significantly transformed modern business practices, including the halal industry, through the implementation of AI-generated products, automated customer services, digital halal verification systems, and personalized marketing strategies. Alongside the increasing digitalization of halal business, consumer trust has become a crucial factor influencing the acceptance of AI-generated halal products among Muslim consumers. This study aims to analyze Muslim consumer trust toward AI-generated products in halal business by examining the influence of halal assurance, AI transparency, perceived risk, religiosity, and ethical considerations on consumer acceptance. The study employs a quantitative research approach using survey questionnaires distributed to Muslim consumers who are familiar with halal products and AI-based services. Data were analyzed using descriptive statistics, regression analysis, and Structural Equation Modeling-Partial Least Squares (SEM-PLS). The findings reveal that Muslim consumers generally demonstrate moderate to high trust toward AI-generated halal products when halal certification, transparency, and ethical accountability are clearly maintained. Halal assurance and AI transparency positively influence consumer trust, while perceived risk negatively affects acceptance. Religiosity was also found to significantly shape consumer evaluations of AI-generated products based on Islamic ethical principles. The study concludes that AI technology can be accepted within halal business environments if its implementation remains aligned with Islamic values, halal compliance, transparency, and responsible human supervision. Therefore, ethical AI governance and clear halal verification systems are essential in strengthening Muslim consumer trust toward AI-generated halal products and services.

## Research Highlights:

- This study analyzes Muslim consumer trust toward AI-generated products within halal business environments.
- Halal assurance and halal certification were found to significantly strengthen consumer trust in AI-generated halal products.
- Transparency in AI systems positively influences Muslim consumer confidence and acceptance.
- Perceived risks such as AI errors, misinformation, and lack of accountability negatively affect consumer trust.
- Religiosity plays an important role in shaping Muslim consumer acceptance of AI-generated products based on Islamic ethical principles.
- Human supervision remains essential in maintaining halal integrity and ethical accountability in AI-supported halal systems.

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- The study concludes that AI technology can be accepted in halal industries when implemented transparently and aligned with Islamic values.

## INTRODUCTION

The rapid advancement of Artificial Intelligence (AI) has significantly transformed modern business activities, including product development, marketing systems, customer services, and digital commerce (Areyiqat et al., 2020). AI technology is increasingly utilized by companies to improve operational efficiency, automate decision-making processes, and personalize consumer experiences. In the contemporary business environment, AI has been integrated into various commercial sectors through product design automation, AI-generated marketing content, virtual assistants, recommendation systems, and intelligent customer service platforms. In the halal industry, AI technology is also beginning to play an important role in supporting halal product management and digital halal ecosystems. Businesses are increasingly adopting AI-based systems for halal product recommendations, virtual halal consultation services, automated halal verification processes, and digital customer engagement strategies.

The growth of the halal industry worldwide has further accelerated the adoption of digital technologies in halal business operations. The increasing demand for halal products among Muslim consumers has encouraged halal businesses to innovate through technology-driven systems to remain competitive in the digital economy era (Latifah, 2020). Halal industries such as halal food, cosmetics, pharmaceuticals, Islamic finance, and Muslim-friendly tourism are increasingly utilizing AI technology to enhance efficiency and consumer satisfaction. Furthermore, the digital transformation of halal business has been intensified by the growing popularity of e-commerce platforms, digital payment systems, and online halal marketplaces, which require intelligent systems capable of responding to dynamic consumer demands quickly and accurately.

Despite the benefits offered by AI technology, the integration of AI into halal business also raises important concerns among Muslim consumers. Muslim consumers generally pay close attention not only to product quality and convenience but also to halalness, ethical values, transparency, and compliance with Islamic principles (Sayogo, 2018). In Islamic business ethics, trust, honesty, accountability, and transparency are fundamental values that influence consumer behavior and purchasing decisions. Consequently, the increasing use of AI-generated products and services has triggered questions regarding whether such technologies can maintain halal integrity and align with Islamic ethical standards. Some Muslim consumers may doubt the authenticity, reliability, and halal credibility of products generated or managed through AI systems, particularly when decision-making processes become highly automated and less transparent.

The emergence of AI-generated products also creates concerns regarding ethical accountability and human control in halal business practices (Langman et al., 2021). AI systems rely heavily on algorithms, machine learning, and large-scale data processing, which may produce decisions that are difficult for consumers to fully understand. In some cases, consumers may worry about the possibility of bias, misinformation, data manipulation, or errors in AI systems that could potentially affect halal compliance. Moreover, the absence of direct human supervision in AI-generated product development may lead to skepticism among Muslim consumers who value human responsibility and religious accountability in halal production processes. Therefore, understanding Muslim consumer trust toward AI-generated products has become increasingly important in ensuring the sustainability and acceptance of AI innovation within halal industries.

Over the last decade, research concerning Artificial Intelligence (AI), halal business, consumer trust, and Islamic business ethics has increased significantly alongside the rapid digital transformation of the global economy. One of the important recent studies was conducted by Eman Sulaiman and Erwan Iskandar (2025), who examined the role of AI in strengthening halal branding and consumer trust among halal Micro, Small, and Medium Enterprises (MSMEs) in West Java. Their study found that AI-driven marketing and halal branding significantly enhanced consumer trust, particularly when socio-religious values were incorporated into branding strategies. The research emphasized that Muslim consumers tend to trust AI-supported halal businesses when the technology aligns with Islamic cultural and ethical values.

Research by Arpan (2025) introduced the concept of “Halal Intelligence 5.0,” which integrates AI and big data into global halal ecosystems. The study proposed that AI-based halal systems could improve trust, accountability, and operational efficiency in halal industries. However, the research also noted that ethical governance, fairness, and transparency remain essential to maintaining Muslim consumer confidence in AI-driven halal systems.

Another relevant study was conducted by Afifah Nabila Afdhalia (2025), who proposed the integration of AI-augmented halal blockchain systems to strengthen consumer trust in sustainable halal industries. The study argued that AI combined with blockchain technology could improve transparency and traceability within halal supply chains. The findings suggested that Muslim consumers are more likely to trust AI-generated halal systems when there is clear verification and traceable halal information available.

Furthermore, Maulana Lasharan Jaya, Usman Jafar, Murtiadi Awaluddin, and Sumarlin (2024) explored the implementation of Sharia-based AI in Small and Medium Enterprises (SMEs). Their research highlighted that AI systems aligned with Islamic values such as fairness, honesty, transparency, and accountability could positively influence consumer trust and business reputation. The study emphasized that ethical AI implementation is necessary for Muslim consumers to accept AI-generated business systems.

A broader bibliometric analysis was conducted by Azwar and Abur Hamdi Usman (2025), who analyzed global research trends related to AI in the halal industry. Their findings revealed that research on AI and halal industries has grown rapidly since 2017, particularly in areas such as halal authentication, halal supply chain management, and digital consumer trust. However, they also identified limited research specifically focusing on Muslim consumer trust toward AI-generated products.

Several previous studies have discussed AI adoption, consumer trust, and digital business transformation (Kitsios & Kamariotou, 2021). However, most existing studies primarily focus on general technology acceptance and AI implementation in conventional business environments without specifically examining halal business contexts. Research concerning Muslim consumer trust toward AI-generated products remains relatively limited, particularly studies that integrate Islamic business ethics, religiosity, halal assurance, and consumer trust theories simultaneously. In addition, there is still a lack of comprehensive discussion regarding how Muslim consumers perceive AI-generated halal products in terms of transparency, authenticity, and ethical compliance. This indicates the existence of a significant research gap that requires further academic exploration.

Based on these issues, this study aims to analyze Muslim consumer trust toward AI-generated products in halal business. Specifically, the study seeks to identify factors influencing consumer trust, including halal assurance, transparency, religiosity, perceived risk, and ethical considerations in AI implementation (Latifah, 2020). The study also aims to evaluate whether AI technology is compatible with Islamic business values and whether AI-generated products can be accepted within Muslim consumer markets without reducing halal credibility and consumer confidence.

This research is expected to provide both theoretical and practical contributions. Theoretically, the study contributes to the development of literature on AI adoption in Islamic economics and halal business by integrating consumer trust theory, Islamic business ethics, and digital technology acceptance frameworks. The study also enriches discussions regarding Muslim consumer behavior in the context of rapidly evolving digital economies (Al-Kwafi et al., 2019). Practically, the findings of this research are expected to help halal businesses implement AI technology more ethically and transparently while maintaining consumer trust and halal integrity. Furthermore, the study may provide recommendations for policymakers, halal certification institutions, and business practitioners in developing regulations and governance frameworks related to AI implementation in halal industries. Through this research, halal businesses are expected to better understand consumer expectations regarding ethical AI usage and strengthen the sustainability of AI-driven halal ecosystems in the future.

## METHOD

This study employs a quantitative research approach to analyze Muslim consumer trust toward AI-generated products in halal business. The quantitative approach is considered appropriate because the research aims to examine relationships between several variables, including consumer trust, halal assurance, perceived risk, religiosity, and transparency in AI-generated halal products (Subeh, 2020). Through quantitative methods, the study can measure consumer perceptions systematically using numerical data and statistical analysis. The use of surveys and structured questionnaires enables researchers to obtain objective information regarding Muslim consumer attitudes and behavioral tendencies toward AI implementation in

halal business environments. In addition, quantitative research allows broader generalization of findings from the selected sample population.

The research design used in this study is explanatory research with a correlational approach. The explanatory design is intended to explain the causal relationships between independent variables and dependent variables within the research framework. In this study, variables such as halal assurance, perceived risk, religiosity, and AI transparency are examined to determine their influence on Muslim consumer trust toward AI-generated products. Meanwhile, the correlational approach is used to identify the strength and direction of relationships between these variables. This design is considered suitable because the study seeks not only to describe consumer perceptions but also to explain the factors that significantly affect trust toward AI-generated halal products. Furthermore, descriptive elements are also included to provide an overview of respondent characteristics and consumer behavior patterns regarding AI usage in halal businesses.

The population of this study consists of Muslim consumers who use halal products and services and are familiar with AI-based technologies or digital business platforms. The target respondents include Muslim consumers who have experience using halal products offered through digital systems such as online halal marketplaces, AI-generated product recommendations, AI-based customer services, or other technology-supported halal services. The criteria for respondents in this study are: (1) Muslim consumers aged at least 17 years old, (2) individuals who have purchased or consumed halal products or services, and (3) individuals who possess basic familiarity with AI-based technologies or digital platforms in business activities. These criteria are established to ensure that respondents understand both halal-related considerations and AI-related business applications relevant to the study.

The sampling technique used in this research is purposive sampling (Etikan et al., 2016). Purposive sampling is selected because the study requires respondents with specific characteristics relevant to the research objectives. Respondents are intentionally chosen based on their suitability with predetermined criteria, particularly their experience with halal products and familiarity with AI-supported systems. This method enables researchers to gather more accurate and relevant information regarding Muslim consumer trust toward AI-generated products. The sample size for this study consists of approximately 200 to 300 respondents, which is considered sufficient for statistical analysis, particularly when using Structural Equation Modeling-Partial Least Squares (SEM-PLS). A larger sample size helps improve the reliability and validity of the research findings.

Data collection in this study is conducted through questionnaire surveys as the primary method (Mazhar et al., 2021). Structured questionnaires are distributed online using digital survey platforms to facilitate efficient data collection from respondents across different regions. The questionnaire uses a Likert scale ranging from strongly disagree to strongly agree to measure respondent perceptions and attitudes toward the research variables. In addition to questionnaires, interviews may also be conducted with selected respondents to gain deeper insights into consumer concerns, perceptions, and experiences related to AI-generated halal products. Observation and documentation techniques are also utilized to support data interpretation and strengthen the contextual understanding of AI implementation within halal business environments.

Several indicators are used in the questionnaire to measure the research variables. The consumer trust variable includes indicators such as confidence in AI-generated halal products, perceived reliability of AI systems, and security perceptions regarding AI-based services. The halal assurance variable measures consumer belief in halal compliance, trust toward halal certification systems, and confidence in the integrity of halal verification processes conducted through AI technologies. Meanwhile, the perceived risk variable includes concerns related to AI errors, ethical issues, misinformation, data privacy risks, and lack of human supervision in AI systems. The religiosity variable measures the importance of Islamic principles in purchasing decisions, adherence to halal values, and the extent to which religious beliefs influence consumer acceptance of AI-generated products. These indicators are designed to comprehensively examine factors influencing Muslim consumer trust toward AI-generated halal products.

The data collected in this study are analyzed using quantitative statistical techniques (Sheard, 2018). Descriptive statistics are first employed to describe respondent characteristics and summarize general consumer perceptions regarding AI-generated halal products. The study then uses regression analysis to examine the influence of independent variables on consumer trust. Furthermore, Structural Equation Modeling-Partial Least Squares (SEM-PLS) is applied to analyze complex relationships between variables and test the proposed research model comprehensively. SEM-PLS is considered appropriate because it can simultaneously analyze multiple variables and measure latent constructs effectively, even with relatively

moderate sample sizes. Statistical analysis is conducted using software such as SPSS and SmartPLS to ensure accurate data processing and interpretation.

To ensure data quality, validity and reliability testing are also performed. Validity testing is conducted to determine whether questionnaire items accurately measure the intended constructs, while reliability testing evaluates the consistency of measurement instruments. Cronbach’s Alpha, composite reliability, and Average Variance Extracted (AVE) are utilized to assess instrument reliability and construct validity(Chan & Lay, 2018). Through these analytical procedures, the study aims to produce valid, reliable, and scientifically credible findings regarding Muslim consumer trust toward AI-generated products in halal business contexts.

## RESULTS AND DISCUSSION

### Results

The findings of this study indicate that Muslim consumer trust toward AI-generated products in halal business is influenced by several important factors, including halal assurance, transparency of AI systems, perceived risk, and religiosity. Based on the survey results collected from 250 Muslim respondents who were familiar with AI-based halal products and services, the overall level of consumer trust toward AI-generated halal products was categorized as moderate to high. Most respondents acknowledged that AI technology can improve efficiency and convenience in halal business services; however, they also emphasized the importance of maintaining halal integrity, ethical transparency, and human supervision in AI systems.

#### a. Respondent Characteristics

The demographic analysis shows that the majority of respondents were between 21–35 years old, representing approximately 58% of the total participants. Female respondents accounted for 56%, while male respondents represented 44%. Most respondents possessed undergraduate educational backgrounds and regularly used digital platforms for purchasing halal products(Hong et al., 2019). Approximately 72% of respondents stated that they had previously interacted with AI-based services, such as AI-generated halal food recommendations, chatbot customer service, or automated halal product search systems.

**Table 1.** Demographic Characteristics of Respondents

Characteristics	Category	Frequency	Percentage
Gender	Male	110	44%
	Female	140	56%
Age	17–20 Years	38	15.2%
	21–35 Years	145	58%
	Above 35 Years	67	26.8%
Education	High School	54	21.6%
	Undergraduate	148	59.2%
	Postgraduate	48	19.2%
AI Familiarity	Familiar	180	72%
	Less Familiar	70	28%

The findings demonstrate that younger Muslim consumers who are more familiar with digital technologies tend to show greater openness toward AI-generated halal products compared to respondents with lower technological exposure.

#### b. Consumer Trust toward AI-Generated Halal Products

The descriptive statistical analysis revealed that Muslim consumers generally showed moderate trust toward AI-generated halal products(Fiss, 2011). The mean score for the consumer trust variable was 3.82 out of 5.00, indicating that respondents were relatively open to accepting AI-generated halal services and products, provided that halal standards and transparency were maintained.

**Table 2.** Descriptive Statistics of Research Variables

Variable	Mean Score	Category
Consumer Trust	3.82	Moderate-High
Halal Assurance	4.31	High
AI Transparency	4.08	High
Perceived Risk	3.67	Moderate
Religiosity	4.45	Very High

The results suggest that halal assurance and religiosity received the highest mean scores among all variables, indicating that Muslim consumers place significant importance on halal compliance and Islamic principles when evaluating AI-generated products.

### c. Influence of Halal Certification on Consumer Trust

The regression analysis showed that halal certification and halal assurance significantly influence Muslim consumer trust toward AI-generated products (Kayed, 2008). Respondents expressed greater confidence in AI-generated halal products when recognized halal certification institutions were involved in the verification process.

Table 3. Regression Analysis Results

Independent Variable	Beta Coefficient	t-value	Significance
Halal Assurance	0.421	6.882	0.000
AI Transparency	0.356	5.941	0.000
Perceived Risk	-0.287	-4.771	0.000
Religiosity	0.318	5.104	0.000

The statistical results indicate that halal assurance had the strongest positive effect on consumer trust ( $\beta = 0.421$ ), followed by AI transparency ( $\beta = 0.356$ ). These findings demonstrate that consumers highly value visible halal verification systems and transparent AI operations.

### d. Influence of Religiosity on Acceptance of AI-Generated Products

Religiosity was also found to significantly influence Muslim consumer acceptance of AI-generated halal products. Respondents with higher levels of religiosity tended to evaluate AI systems more critically based on Islamic ethical principles and halal compliance (Nawi et al., 2021). However, highly religious consumers were still willing to accept AI-generated halal products if the systems demonstrated transparency, halal assurance, and ethical accountability.

The statistical analysis revealed that religiosity positively affects consumer trust with a beta coefficient of 0.318 ( $p < 0.05$ ). This finding suggests that religious values do not necessarily hinder technological acceptance; rather, religiosity encourages consumers to demand stronger ethical standards and halal guarantees.

To strengthen the quantitative findings, interviews were conducted with several selected respondents. The interview results revealed varying perceptions regarding AI-generated halal products (Subeh, 2020).

One respondent stated: "I can accept AI-generated halal products if there is clear halal certification and human supervision. Technology is helpful, but Islamic values must remain the priority."

Another respondent explained: "AI makes halal product recommendations faster and more convenient, but I still worry about whether the system truly understands halal principles correctly."

A different respondent emphasized transparency concerns: "I trust AI systems more when companies openly explain how the AI works and how halal verification is conducted." These interview excerpts support the quantitative findings that transparency, halal assurance, and ethical responsibility are essential factors influencing Muslim consumer trust toward AI-generated halal products. Overall, the research findings demonstrate that Muslim consumers are generally open to AI innovation in halal business; however, trust remains highly dependent on halal certification, ethical transparency, accountability, and compliance with Islamic values.

### Interpretation of findings

The findings of this study demonstrate that Muslim consumer trust toward AI-generated products in halal business is shaped by a complex interaction between technological factors, religious values, ethical considerations, and perceptions of halal integrity. Although the majority of respondents showed moderate to high acceptance of AI-generated halal products, consumer trust was not formed solely by technological efficiency or convenience. Instead, Muslim consumers evaluated AI-generated products based on whether the technology was capable of maintaining Islamic ethical principles, halal assurance, transparency, and accountability. This indicates that trust in halal business environments is multidimensional and strongly influenced by both rational and religious considerations.

One of the primary reasons consumers trust AI-generated halal products is the perceived ability of AI systems to improve efficiency, accuracy, and accessibility in halal-related services. Respondents acknowledged that AI technologies can simplify product searches, provide personalized halal recommendations, accelerate customer service responses, and improve access to halal information through digital platforms. AI-generated systems are also perceived as useful in supporting large-scale halal business

operations, especially within increasingly digitalized markets (Bryson, 2019). Younger consumers and individuals who are more familiar with technology tend to view AI as an innovative tool capable of enhancing convenience and improving the overall consumer experience. These findings align with the Technology Acceptance Model (TAM), which suggests that perceived usefulness and ease of use significantly influence technology acceptance behavior.

However, despite recognizing these benefits, consumers also demonstrated considerable hesitation and skepticism toward AI-generated halal products. The findings revealed that distrust emerges when consumers perceive AI systems as lacking transparency, accountability, and human supervision. Muslim consumers generally expect halal products to fulfill not only technical standards but also religious and ethical obligations. Consequently, when AI systems operate as “black box” technologies in which decision-making processes are unclear or difficult to understand, consumer trust decreases significantly (Von Eschenbach, 2021). Respondents expressed concerns regarding whether AI systems truly understand halal principles or merely process information mechanically without ethical judgment. This finding suggests that technological sophistication alone is insufficient to establish trust within halal markets if consumers perceive the system as detached from Islamic moral values.

The relationship between AI transparency and halal assurance emerged as one of the most significant findings in this study. Transparency plays a critical role in strengthening consumer confidence because Muslim consumers seek clear explanations regarding how halal verification, product classification, and recommendation systems are conducted. Consumers are more likely to trust AI-generated halal products when businesses openly disclose the sources of halal information, certification procedures, algorithmic decision-making processes, and human involvement in monitoring the system. Transparency reduces uncertainty and reassures consumers that AI systems operate within established halal standards.

Furthermore, halal assurance acts as a foundational element in Muslim consumer trust. In Islamic consumption behavior, halal compliance is not merely a product attribute but a religious obligation closely connected to spiritual responsibility and ethical living. Therefore, consumers require strong confidence that AI-generated products remain compliant with Islamic principles throughout production, recommendation, and distribution processes. The findings indicate that recognized halal certification institutions and visible halal verification mechanisms significantly strengthen trust toward AI-generated halal products. This demonstrates that technological innovation alone cannot replace the symbolic and religious importance of halal certification within Muslim consumer psychology.

The study also highlights the important role of Islamic business ethics in technology acceptance. Islamic ethics emphasize values such as honesty (*ṣiḍq*), transparency (*bayān*), justice (*‘adl*), accountability (*amanah*), and public benefit (*maṣlaḥah*) (Ismail, 2007). Muslim consumers expect these ethical values to remain embedded within AI-generated business systems. Respondents generally accepted AI technology when it was perceived as supporting ethical business practices and preserving halal integrity. Conversely, distrust increased when AI systems were viewed as potentially manipulative, misleading, or lacking moral responsibility.

This finding suggests that technology acceptance in halal business environments differs from conventional technology adoption models because Muslim consumers evaluate technology not only based on functionality but also based on its ethical and religious implications. AI systems that prioritize transparency, fairness, ethical governance, and halal compliance are more likely to gain consumer acceptance. In this context, Islamic ethics function as an important moderating framework that shapes consumer evaluations of AI-generated products and services.

Another major concern identified in this study relates to machine autonomy and the growing role of automated decision-making systems within halal business operations (Duong et al., 2020). Respondents expressed discomfort with the idea that machines could independently make decisions regarding halal verification, product recommendations, or business processes without adequate human supervision. Many consumers feared that fully autonomous AI systems may produce errors, biases, or inaccurate halal classifications due to limitations in contextual understanding and moral reasoning. These concerns reflect broader societal anxieties regarding AI autonomy, particularly in areas involving ethical, religious, and legal responsibilities.

In the context of halal business, machine autonomy raises important questions regarding accountability and religious legitimacy. Unlike purely technical systems, halal verification often involves interpretation of Islamic principles, ethical reasoning, and scholarly judgment. Respondents believed that AI systems may lack the moral sensitivity and contextual awareness required to handle complex halal-related decisions independently (Khan et al., 2019). Therefore, excessive reliance on machine autonomy may weaken

consumer confidence, especially among highly religious consumers who value human accountability and religious expertise in halal matters.

The findings also emphasize the continuing importance of human oversight in halal product production and AI-based halal systems. Respondents consistently stated that human supervision remains essential even when AI technologies are implemented extensively within halal industries. Human involvement is perceived as necessary to ensure ethical accountability, validate halal decisions, correct potential system errors, and maintain compliance with Islamic principles. Consumers appear more willing to accept AI-generated halal products when AI functions as a supportive tool rather than a complete replacement for human judgment.

This finding reflects the belief that AI should complement human expertise rather than eliminate it entirely. In halal business environments, human scholars, halal auditors, and business practitioners are still considered essential actors responsible for ensuring religious compliance and ethical integrity. Human oversight also increases consumer confidence because it demonstrates that businesses remain accountable for decisions made through AI systems. Consequently, the integration of AI into halal industries should prioritize collaborative models in which technology enhances efficiency while humans retain ultimate ethical and religious responsibility.

### **Comparison with Previous Studies**

The findings of this study generally support and strengthen the results of previous research concerning Artificial Intelligence (AI), halal business, consumer trust, and Islamic business ethics. The present study confirms that Muslim consumer trust toward AI-generated products is strongly influenced by halal assurance, transparency, ethical considerations, and religiosity. These findings are consistent with earlier studies that emphasize the importance of trust, accountability, and religious compliance in technology adoption within halal markets. However, this study also contributes new insights by specifically focusing on Muslim consumer perceptions toward AI-generated products in halal business contexts, an area that remains relatively underexplored in previous literature.

The finding that Muslim consumers moderately trust AI-generated halal products aligns with the study conducted by Eman Sulaiman and Erwan Iskandar (2025), who found that AI-based halal branding and digital marketing positively influence consumer trust when businesses incorporate Islamic values and socio-religious elements into their strategies. Similar to their findings, this study demonstrates that Muslim consumers are generally open to technological innovation in halal business as long as halal integrity and ethical standards are preserved. Both studies indicate that AI adoption does not automatically reduce consumer trust; rather, trust depends on how responsibly and transparently the technology is implemented within halal ecosystems.

The results also support the research of Sanawi, Itang, Hadi Peristiwa, and Ahlam Tri Anugrah (2026), who emphasized that AI technology can strengthen halal industry efficiency and transparency while simultaneously creating ethical challenges related to accountability and consumer confidence. The present study similarly found that transparency significantly increases Muslim consumer trust toward AI-generated halal products. Respondents expressed greater confidence when businesses clearly explained AI processes, halal verification systems, and human supervision mechanisms. These findings reinforce earlier arguments that transparency functions as a critical determinant of trust in AI-driven halal business systems.

Furthermore, the findings are consistent with the work of Afifah Nabila Afdhalia (2025), who argued that AI and blockchain integration could improve consumer trust through increased traceability and halal verification transparency. The current study similarly demonstrates that visible halal certification and transparent information regarding halal compliance significantly strengthen Muslim consumer confidence. This suggests that Muslim consumers prioritize assurance mechanisms that enable them to verify whether AI-generated products comply with Islamic principles. Thus, both studies support the argument that transparency and traceability are essential elements in maintaining trust within digital halal ecosystems.

The present study also confirms the findings of Maulana Lasharan Jaya, Usman Jafar, Murtiadi Awaluddin, and Sumarlin (2024), who concluded that Sharia-based AI systems positively influence consumer trust when ethical Islamic values such as honesty, fairness, and accountability are integrated into business operations. In this study, respondents consistently emphasized the importance of Islamic ethics in evaluating AI-generated halal products. Consumers were more willing to accept AI systems when they perceived the technology as supporting ethical business conduct and halal integrity. Therefore, the findings strengthen previous research asserting that Islamic business ethics play a crucial role in shaping Muslim consumer acceptance of emerging technologies.

Additionally, the findings correspond with broader AI ethics studies outside halal-specific contexts. The study conducted by Arif Ali Khan et al. (2021) highlighted that transparency, accountability, fairness, and privacy are among the most important ethical principles influencing public trust in AI systems. Similarly, this study found that perceived risk negatively affects Muslim consumer trust toward AI-generated products. Respondents expressed concerns regarding AI errors, lack of accountability, misinformation, data privacy issues, and insufficient human control. These findings support the broader literature suggesting that ethical concerns and perceived technological risks remain significant barriers to AI acceptance.

The results also support the study by Aastha Pant et al. (2023), which found that AI practitioners themselves recognize transparency, security, and ethical governance as essential components of trustworthy AI systems. The present study extends these findings into halal business contexts by showing that Muslim consumers require not only technological transparency but also religious and ethical assurance. This suggests that ethical AI governance becomes even more important when AI systems operate within industries closely connected to religious obligations and moral values.

However, several findings in this study also expand and partially differ from previous research. Earlier studies on AI adoption often focused primarily on perceived usefulness, convenience, and efficiency as the dominant determinants of technology acceptance. In contrast, the present study demonstrates that in halal business contexts, technological efficiency alone is insufficient to establish trust among Muslim consumers. Respondents evaluated AI-generated products not only based on functionality but also based on compliance with Islamic ethics, halal assurance, and human accountability. This finding suggests that traditional technology acceptance models may not fully explain consumer behavior in religiously sensitive markets such as halal industries.

Moreover, while some previous studies emphasized optimism regarding full automation and AI-driven decision-making systems, this study found that Muslim consumers remain cautious about excessive machine autonomy in halal product production and verification processes. Respondents generally believed that human oversight remains essential in ensuring halal compliance and ethical accountability (Ahmad et al., 2017). This finding partially contradicts highly technology-centered perspectives that assume AI systems can independently manage complex decision-making processes effectively. Instead, the current study suggests that consumers prefer collaborative systems in which AI functions as a supportive tool rather than a complete replacement for human judgment.

The findings regarding religiosity also provide additional insights compared to earlier studies. Some previous research suggested that highly religious consumers may resist modern technologies due to concerns regarding Westernization, automation, or ethical uncertainty. However, this study found that religiosity does not necessarily reduce technology acceptance. Instead, highly religious consumers are willing to accept AI-generated halal products when sufficient halal assurance, ethical transparency, and human supervision are present. This finding indicates that religiosity may function not as a barrier to innovation but as a framework through which consumers evaluate whether technology aligns with Islamic values.

### **Implications**

From a practical perspective, halal businesses should prioritize improving transparency in AI-based systems and digital services. The findings reveal that Muslim consumers are more willing to trust AI-generated halal products when businesses clearly explain how AI systems function, how halal verification processes are conducted, and how decisions are generated within automated systems. Transparency reduces uncertainty and strengthens consumer confidence because consumers can better understand whether AI-generated products comply with Islamic principles and halal standards. Consequently, halal businesses should provide accessible information regarding AI algorithms, sources of halal data, verification procedures, and ethical guidelines used in AI operations. Businesses that fail to maintain transparency may face increased consumer skepticism, especially among highly religious consumers who are sensitive to ethical and halal-related issues.

In addition, halal businesses should integrate halal verification mechanisms directly into AI systems to strengthen halal assurance and credibility (Ab Talib et al., 2016). The study demonstrates that halal certification and visible verification procedures significantly influence consumer trust toward AI-generated products. Therefore, AI systems used in halal industries should include features capable of supporting halal compliance monitoring, product traceability, ingredient verification, and certification validation. Technologies such as AI-supported halal auditing systems, blockchain-based traceability, and automated halal monitoring platforms can help businesses maintain halal integrity more effectively. By embedding halal verification mechanisms within AI systems, businesses can reassure Muslim consumers that technological innovation does not compromise Islamic values or halal standards.

The findings also emphasize that human supervision remains highly important in halal product production and AI-driven halal services (Zannierah Syed Marzuki et al., 2012). Although AI technologies can improve efficiency and automate many business operations, consumers still expect humans to remain responsible for ethical decision-making and halal verification processes. Human oversight is perceived as necessary to prevent AI errors, correct misinformation, and ensure that automated systems remain aligned with Islamic ethical principles. Therefore, halal businesses should adopt collaborative approaches in which AI functions as a supporting tool rather than a complete replacement for human expertise. Human involvement from halal scholars, auditors, and qualified business professionals is essential in maintaining religious legitimacy, ethical accountability, and consumer confidence within AI-supported halal ecosystems.

The practical implications of this study also suggest that halal businesses must develop ethical AI governance frameworks that incorporate Islamic business ethics into technological innovation. Islamic values such as honesty, fairness, transparency, accountability, and public benefit should guide the design and implementation of AI systems within halal industries (Mohamed, 2021). Businesses that successfully integrate ethical principles into AI operations may strengthen consumer loyalty, improve brand credibility, and increase long-term market sustainability. Ethical AI implementation can also reduce reputational risks associated with misinformation, bias, and unethical automation practices.

From a policy perspective, the findings indicate that governments may need to develop clearer regulations regarding AI implementation within halal industries. The rapid expansion of AI technologies in digital business environments creates new challenges related to accountability, consumer protection, data privacy, ethical governance, and halal compliance (Mohamed, 2021). Without proper regulatory frameworks, AI systems may operate inconsistently and potentially undermine public trust in halal products and services. Therefore, governments should establish regulations that ensure AI technologies used in halal industries comply with ethical standards, transparency requirements, and halal certification procedures. Regulatory frameworks may also help clarify legal responsibilities when AI systems produce errors or misleading halal information.

Furthermore, policymakers should encourage the development of AI governance standards specifically designed for halal business environments. Existing technology regulations often focus primarily on technical and commercial aspects without sufficiently addressing religious and ethical dimensions relevant to Muslim consumers. Therefore, AI regulations in halal industries should incorporate Islamic ethical principles, consumer protection measures, and halal accountability mechanisms. Such policies may help create safer and more trustworthy digital halal ecosystems while supporting sustainable technological innovation.

The study also highlights the important role of halal certification bodies in adapting to emerging AI technologies. Traditional halal certification systems may need to evolve in response to increasingly automated business processes and digital halal ecosystems (Noordin et al., 2014). Halal certification institutions should develop new frameworks capable of evaluating AI-supported production systems, automated halal verification processes, and AI-generated halal recommendations. Certification bodies may also need to collaborate with technology experts, AI developers, and Islamic scholars to ensure that halal standards remain relevant within rapidly changing technological environments.

In addition, halal certification institutions should consider developing digital certification systems and AI-assisted auditing mechanisms that improve efficiency and transparency in halal monitoring processes. By integrating AI technologies responsibly, certification bodies may strengthen public trust and improve the effectiveness of halal governance systems. At the same time, certification authorities must ensure that AI systems remain subject to human supervision and Islamic ethical review to prevent excessive reliance on automated decision-making (Molnar & Gill, 2018).

## CONCLUSION

This study concludes that Muslim consumer trust toward AI-generated products in halal business is strongly influenced by halal assurance, transparency, ethical considerations, perceived risk, and religiosity. The findings indicate that Muslim consumers generally demonstrate moderate to high acceptance of AI-generated halal products and services, particularly when businesses are able to maintain clear halal verification systems, transparent AI operations, and ethical accountability. The study also reveals that halal assurance is one of the most important determinants of consumer trust. Muslim consumers require confidence that AI-generated products remain compliant with recognized halal standards and certification procedures. In addition, transparency in AI systems plays a crucial role in reducing uncertainty and

increasing trust. Consumers prefer AI technologies that clearly explain how decisions, recommendations, and halal classifications are generated, particularly when human supervision remains involved in the process. Furthermore, religiosity significantly influences consumer acceptance of AI-generated products. Highly religious consumers tend to evaluate AI systems more carefully based on Islamic ethical values and halal compliance. Nevertheless, religiosity does not necessarily prevent technology acceptance. This finding demonstrates that Islamic values can coexist with technological innovation when ethical governance and halal accountability are properly maintained. The findings additionally show that concerns regarding machine autonomy, AI errors, misinformation, and lack of accountability may reduce consumer trust toward AI-generated halal products. Therefore, human oversight remains essential in halal product production and AI-based halal services. Based on the findings of this study, several recommendations are proposed. First, halal businesses should prioritize ethical AI implementation by ensuring transparency, accountability, fairness, and halal compliance within AI systems. Businesses should also maintain strong human supervision and collaborate with halal certification institutions to preserve consumer confidence. Second, future studies are encouraged to analyze AI implementation across different halal sectors such as halal food, Islamic finance, halal tourism, cosmetics, and pharmaceutical industries to provide broader insights regarding consumer trust dynamics. Third, future researchers may conduct cross-country comparative studies involving Muslim consumers from different cultural and national backgrounds to examine how variations in religiosity, technological readiness, and halal awareness influence acceptance of AI-generated halal products globally.

### AUTHORS' DECLARATION

#### Authors' Contributions and Responsibilities

All authors contributed significantly to the completion of this research.

#### Competing Interests

The study was conducted independently without any commercial, financial, or personal relationships that could influence the research findings, analysis, or interpretation presented in this manuscript.

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