

Halal Assurance Technology as a Source of Marketing Information: An Integrative Literature Review on the Use of Information

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Article history

Submitted: 2026/10/07; Revised: 2026/10/11; Accepted: 2026/08/17

Abstract

The development of technology in halal assurance systems has expanded the ability to document, trace, verify, and provide information about the halal status and processes of products. However, the existence of halal information does not by itself explain how consumers use that information to evaluate products. This study aims to integrate literature on halal assurance technology with marketing management and consumer information-processing literature to explain the use of halal information in product evaluation. The study employs a qualitative integrative literature review based on structured library research. The main literature covers research on halal technology, traceability, halal certification and information, consumer behavior, information quality, information diagnosticity, and product evaluation. The analysis was conducted through thematic analysis, cross-study comparison, and integrative synthesis. The synthesis shows that halal assurance technology has a marketing function particularly when it facilitates access to information that consumers can use. Information use depends not only on availability, but also on information quality, usefulness, relevance, credibility, and accessibility. In this process, information diagnosticity can serve as a conceptual mechanism for explaining the extent to which information helps consumers form product judgments and evaluate products. These findings are synthesized into the Halal Technology–Marketing Information Framework (HT-MIF), which connects halal assurance technology, halal information, consumer information evaluation, information diagnosticity, product judgment, and marketing response. This framework is conceptual and has not been empirically tested.

Keywords

Halal Technology; Halal Product Assurance; Marketing Information; Information Diagnosticity; Consumer Evaluation; Product Judgment.



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INTRODUCTION

In an increasingly digitalized market, consumers encounter not only products but also various types of information used to assess products before making decisions. Information about ingredients, production processes, certification, product origin, and quality assurance can form part of the consumer evaluation process. For

halal products, the need for such information is important because halal status cannot always be determined from a product's physical characteristics alone.

The development of halal assurance technology has expanded the ability of industry players and relevant institutions to document, trace, verify, and provide information about the halal status and processes of products. Research on online traceability in Indonesia indicates that Muslim consumers consider the ability to trace a product's compliance with halal principles useful and important (Sayogo, 2018). More recent research also shows that system quality, information quality, performance expectations, ease of use, social influence, and trust are associated with consumer acceptance of halal traceability systems (Susanty et al., 2025).

The development of blockchain points in the same direction. Karyani et al. (2024) discuss the use of blockchain to store and verify halal certificates and explore consumer and regulator acceptance. However, these technical capabilities do not automatically explain how available information is used in product evaluation.

This issue matters to marketing management because product information creates value when consumers can use it to understand, compare, and assess a product. Literature on information diagnosticity shows that consumers evaluate the extent to which information helps them understand product quality and performance. Filieri (2015) demonstrates a relationship between information quality, information diagnosticity, and information adoption.

Literature on halal products also shows that halal information does not always produce uniform responses. Maison et al. (2018) found that the effect of halal labels on product perceptions is limited when considered separately and becomes more complex when interacting with country of origin and religion-based purchase behavior. In contrast, Tarigan and Z. (2023) found a positive effect of halal certification on purchase intention in the context they examined.

This article brings together two streams of literature that are more often discussed separately: literature on halal assurance technology and marketing management literature on consumer information evaluation. Its focus is not the direct effect of technology on purchasing, but rather how technology facilitates information that consumers can subsequently use.

To ensure traceability between the questions and the synthesis, the research questions are explicitly formulated as follows: (RQ1) How is technology used in halal assurance to generate and provide information to consumers? (RQ2) What characteristics of technology-based halal information determine its use by consumers? (RQ3) How do consumers use technology-based halal information to

evaluate products? (RQ4) What conditions influence the use of technology-based halal information in consumer evaluation? (RQ5) How can findings across the literature be synthesized to explain halal assurance technology as a source of marketing information?

The article does not contribute a new theory or a new causal test. Its contribution is an integrative synthesis connecting halal assurance technology with the consumer information evaluation process through the Halal Technology–Marketing Information Framework (HT-MIF).

LITERATURE REVIEW

1. Technology in Halal Product Assurance

Halal assurance technology includes tools and systems that support the documentation, authentication, verification, and tracing of information about products and production processes. Technology does not replace institutional halal assurance processes, but supports the management and provision of evidence and information.

Sayogo (2018) shows that online traceability can be perceived as useful information for assessing a product's compliance with halal principles. Vikaliana (2024) positions tracking and tracing as important elements in maintaining halal product integrity. Nugroho et al. (2024) discuss the urgency of technology adoption for authentication and traceability across Indonesia's halal value chain.

However, a system's technical capabilities are not equivalent to successful communication of information to consumers. A system may have advanced technical capabilities yet still produce information that is difficult to understand, difficult to access, or irrelevant. Therefore, technology analysis needs to move beyond system capabilities toward the use of system outputs as information.

2. Islamic Principles on Halal Information and Verification

QS. Al-Baqarah [2]:168 provides a normative foundation concerning halal and tayyib. This principle makes halal status part of a Muslim's consumption considerations.

QS. Al-Hujurat [49]:6 provides the principle of tabayyun, namely the importance of checking or verifying information before taking action based on it. Hadith concerning halal, haram, and doubtful matters also establish the importance

of clarity regarding the status of a matter (Sahih al-Bukhari, 2051; Sahih Muslim, 1599a).

These principles do not mean that the Qur'an and hadith directly prescribe blockchain, QR codes, or any particular technology. Technology is a contemporary instrument that can support documentation, verification, and the provision of information within the institutional context of halal assurance.

3. Product Information in Marketing Management

From a marketing perspective, information is part of the consumer decision environment. Consumers use various product cues to reduce uncertainty and form judgments about products. Halal information can be one such cue when consumers assess a product's fit with their needs and preferences.

Maison et al. (2018) show that halal information does not operate in isolation. Halal labels, country of origin, and religion-based purchase behavior can interact in shaping product perceptions. Ibrahim et al. (2024) also show that product judgment plays a role in the process connecting e-WOM with purchase intention for halal products.

4. From Information Availability to Information Use

Available information is not necessarily used. Consumers need to assess whether information is useful, relevant, credible, and sufficiently clear to support evaluation. Sussman and Siegal (2003) identify perceived usefulness as an important part of the information adoption process.

Filieri (2015) shows that information quality is an important antecedent of information diagnosticity, which is subsequently associated with information adoption. Studies of information quality on review platforms also show that content quality, expression quality, and utility quality can affect information adoption through perceived diagnosticity and credibility (Effects of Information Quality..., 2021).

5. Information Diagnosticity and Product Judgment

Information diagnosticity refers to the extent to which information is perceived to help consumers understand and evaluate the object being assessed. Filieri (2015) demonstrates a relationship among information quality, diagnosticity, and information adoption; Filieri et al. (2018) also show the role of information relevance and certain cues in diagnosticity over time.

In this article, information diagnosticity is not positioned as a proven mediator in the relationship between halal assurance technology and purchase intention. The concept is used as a conceptual mechanism to explain the stage at which halal

information is no longer merely available but is considered helpful in forming product judgment.

METHODS

This study uses a qualitative integrative literature review based on structured library research. An integrative review was selected because it enables the combination of empirical, conceptual, and methodological findings from several streams of literature to build a cross-context synthesis (Whittemore & Knafl, 2005; Torraco, 2005). The literature review is treated as a research method, with attention to source searching, relevance assessment, information extraction, cross-study comparison, and argumentative synthesis (Snyder, 2019).

The search strategy was built around four keyword groups: (1) halal assurance, halal certification, halal traceability, halal verification; (2) blockchain, digital certification, digital technology, artificial intelligence, tracking and tracing; (3) consumer information, information quality, information usefulness, information credibility, information adoption, information diagnosticity; and (4) product evaluation, product judgment, purchase intention, consumer response. Keyword combinations were used flexibly according to the database and search engine, for example: (halal AND traceability AND consumer AND information), (halal AND certification AND blockchain AND consumer), and (information quality AND diagnosticity AND product evaluation). The search focused on publications from 2021–2026, while foundational sources published before 2021 were retained when needed to explain concepts, theories, or methodologies underlying the synthesis.

The inclusion criteria comprised: (a) peer-reviewed journal articles, academic books or book chapters, and relevant normative or institutional documents; (b) substantive discussion of halal assurance technology, halal information, traceability, certification/verification, or consumer information evaluation processes; (c) verifiable bibliographic metadata; and (d) findings or concepts that could be mapped to one of the RQs. Sources were excluded if they discussed technology technically without a connection to halal assurance or consumer information, lacked adequate bibliographic traceability, were duplicates, or did not contribute to the article's focus.

Evidence extraction recorded source identity, research context, type of technology or assurance mechanism, form of information generated or facilitated, consumer constructs examined, main findings, limitations, and the source's function in relation to the RQs. Thus, sources were not treated merely as a reference list, but as evidence units mapped from source → evidence → claim → RQ → synthesis.

Empirical sources were used to support findings about consumer behavior or perceptions; conceptual sources explained mechanisms; and Islamic normative sources provided a value foundation and interpretive boundaries.

The analysis was conducted in four stages. First, thematic analysis identified themes relating to technology, information, consumer evaluation, diagnosticity, and marketing responses. Second, cross-study comparison examined similarities, differences, and boundary conditions across studies. Third, integrative synthesis connected findings on halal technology with marketing management literature. Fourth, conceptual framework development was used to construct the HT-MIF. The synthesis was not used to claim new causal relationships; the relationships among concepts in the HT-MIF are the result of conceptual integration and require empirical testing in future research.

For reporting transparency, PRISMA 2020 was used as a guide for traceability in the identification, screening, and reporting of sources. However, the article is not described as a systematic review because it does not use meta-analytic procedures or claim to follow a complete systematic review protocol (Page et al., 2021). The article uses no primary data and does not statistically test the HT-MIF. Therefore, no corpus size or screening figures that could not be verified from documented search procedures are reported.

Table 1. Evidence Matrix and the Function of Sources in the Synthesis

Evidence group	Verified sources	Findings used	Function in the synthesis
Halal technology & traceability	Sayogo (2018); Susanty et al. (2025); Bachtiar et al. (2025)	Traceability is perceived as useful; information and system quality are associated with acceptance; traceability is associated with transparency and trust.	Explains technology's function as infrastructure for assurance and information provision.
Digital certification & blockchain	Karyani et al. (2024); Zamzami et al. (2025)	Blockchain is used to store/verify certificates; information certainty is associated with trust.	Explains mechanisms of verification, integrity, and information certainty.
Information quality & diagnosticity	Filieri (2015); Filieri et al. (2018); Byun et al. (2021); Niu et al. (2021); Shukla et al. (2025)	Information quality, relevance, credibility, and presentation are associated with diagnosticity/helpfulness and consumer responses; in blockchain-based traceable food, product diagnosticity, informativeness, and trustworthiness are associated with perceived transparency.	Provides the theoretical bridge from halal information to product judgment.
Product evaluation & consumer response	Tajdini (2022); Ibrahim et al. (2024); Maison et al. (2018)	Product characteristics and information credibility are related to evaluation/intention processes; the effect of halal labels may depend on context.	Supports positioning halal information as a conditional product cue.
Boundary conditions & recent	Meuthia et al. (2026); Zafar & Abu-Hussin (2025)	Traceability and consumer factors do not operate uniformly across contexts; halal consumer behavior literature is	Strengthens the argument that the use of halal information is contextual

developments		dominated by themes of religiosity, trust, and certification, while contextual research opportunities remain.	and is not equivalent to a direct effect of technology on purchasing.
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FINDINGS AND DISCUSSION

1. Halal Assurance Technology as Information Infrastructure

The synthesis indicates that technology's function does not stop at managing internal processes. When a system supports traceability, verification, documentation, and information access, technology can become infrastructure connecting assurance processes with consumers' information needs. Sayogo (2018) shows that consumers perceive the ability to trace halal compliance as useful. Karyani et al. (2024) also found that consumers expect an easy-to-use application for checking halal products. These findings support positioning technology as a means of facilitating access to and checking of information, rather than as a direct determinant of product evaluation.

Technology does not directly determine consumer responses. It provides conditions that allow halal assurance information to be better documented and made accessible. Its marketing function emerges when these outputs are translated into information that can be used in product evaluation.

2. Information Availability Is Not the Same as Information Use

Cross-literature findings highlight the importance of distinguishing information availability from information utilization. A system may provide large amounts of data, but consumers may not necessarily use it. Use requires the perception that information is useful, relevant, credible, and easy to understand.

Susanty et al. (2025) show that information quality and several technology acceptance factors are associated with the intention to use halal traceability systems. Information adoption literature also links information quality with diagnosticity and credibility. Therefore, the marketing success of technology should not be measured only by its ability to store or display data, but also by whether the information helps meet consumers' evaluation needs.

3. Information Quality as a Marketing Bridge

Information quality serves as a bridge connecting technological infrastructure with consumer evaluation. Information about certification status, ingredient origin, processes, or traceability evidence gains marketing value when it can be understood and is considered relevant to consumers' questions.

Filieri (2015) shows that information quality is an important antecedent of information diagnosticity in the context of review information. This finding does not directly prove the mechanism for halal products, but provides a conceptual basis for understanding why technology-facilitated halal information does not automatically have equal evaluative value. Other studies show that information quality can affect perceived diagnosticity and information credibility during information adoption (Effects of Information Quality..., 2021).

4. Halal Information as an Input in Product Judgment

Halal information can function as one of the product cues used to form consumer judgments. Maison et al. (2018) show that halal labels interact with country of origin and religion-based purchase behavior. Ibrahim et al. (2024) show that product judgment is an important part of the process connecting e-WOM with purchase intention for halal products.

Halal information is better understood as one input in evaluation rather than the sole cause of a purchase decision. Tarigan and Z. (2023) found a positive effect of halal certification on purchase intention in the context they examined, while other studies show a more limited effect. These differences support the inclusion of boundary conditions.

5. *Information Diagnosticity as a Linking Mechanism*

Information diagnosticity provides a link between information and evaluation. Information becomes diagnostic when consumers consider it capable of helping them understand a product's quality, suitability, or characteristics. Filieri (2015) links diagnosticity with information adoption, while Filieri et al. (2018) demonstrate the role of information relevance and certain cues.

In the halal context, diagnosticity helps explain why two pieces of information that both relate to halal status may not have the same evaluative value. Existing literature supports the importance of information quality, relevance, and usefulness for diagnosticity, while verification capability and accessibility are positioned in the HT-MIF as information-design characteristics that may conceptually support use. Accordingly, the HT-MIF places diagnosticity after consumer information evaluation without claiming that all these characteristics have been tested simultaneously in halal assurance technology.

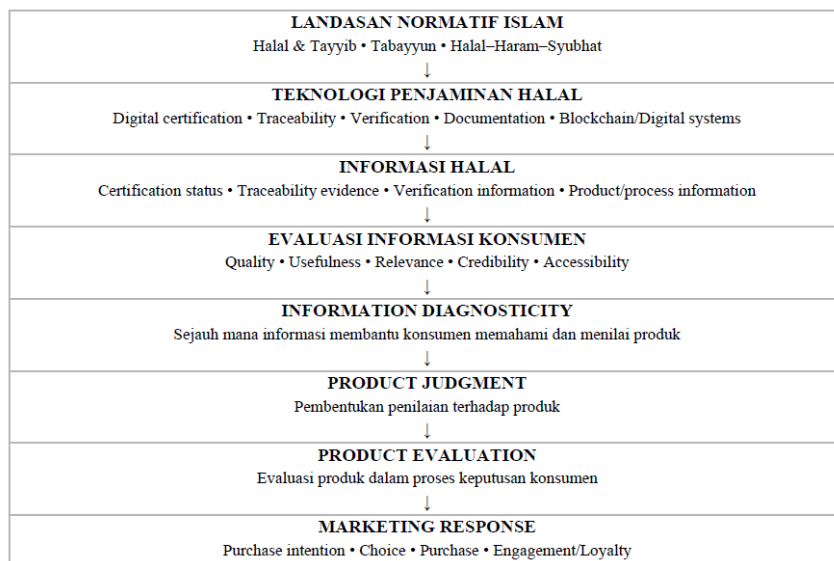
6. *Boundary Conditions in the Use of Halal Information*

The use of halal information does not occur under uniform conditions. The reviewed literature indicates that consumer characteristics and context can change how information is processed or used. Consumer knowledge, involvement, religiosity, product category, perceived risk, and digital context are therefore positioned in the HT-MIF as candidate boundary conditions requiring further testing, rather than as moderators already validated specifically for all relationships in the model. Maison et al. (2018) show the role of religion-based purchase behavior in responses to the combination of halal cues and country of origin, while Ibrahim et al. (2024) demonstrate the importance of source credibility.

Maison et al. (2018) demonstrate the role of religion-based purchase behavior in responses to the combination of halal cues and country of origin. Ibrahim et al. (2024) show the importance of source credibility in information processing and product judgment. The HT-MIF therefore does not assume a universal response pattern.

7. Halal Technology–Marketing Information Framework (HT-MIF)

The synthesis distinguishes two functions of technology. First, the assurance function supports documentation, traceability, verification, and information integrity. Second, the information function facilitates access to assurance outputs so that consumers can use them. The second function explains how technology enters marketing management.



Boundary conditions: consumer knowledge • involvement • religiosity • product category • product complexity • perceived risk • information accessibility • digital context

Figure 1. Halal Technology–Marketing Information Framework (HT-MIF). Source: authors' synthesis; the framework is conceptual and has not been empirically tested.

8. Contribution to Marketing Management

The HT-MIF shifts attention from a technology-centered view to an information-centered view. Technology remains important, but its marketing value depends on how technological outputs become information that consumers can access, understand, and use. This position is supported by research on traceable food, which shows relationships between product diagnosticity, informativeness, and trustworthiness and perceived blockchain transparency, although that study did not focus specifically on halal products (Shukla et al., 2025).

This perspective helps explain why transparency does not always produce the same response. Abundant information that is irrelevant or difficult to understand may have lower evaluative value than information that is concise, credible, relevant, and easy to verify.

9. Managerial Implications

Companies and managers of halal assurance systems need to pay attention to consumer-facing information, not only to the quality of internal systems. Information must be findable and understandable to consumers.

Traceability needs to be translated into information with evaluative value. Providing a code or digital access alone is insufficient if consumers do not know what information can be checked.

Information quality needs to be maintained through accuracy, relevance, credibility, currency, and ease of access. In this article, these principles are managerial implications derived from information quality and diagnosticity literature, rather than a set of characteristics tested simultaneously in halal assurance systems. Halal assurance technology can therefore be developed as part of a product information architecture.

Information design needs to account for consumer differences. Consumers with limited halal knowledge may need simple explanations, while highly involved consumers may need more detailed traceability evidence.

10. Theoretical Implications, Limitations, and Research Agenda

The first contribution is to connect halal assurance technology literature with consumer information processing through technology-facilitated information. The second is to distinguish information availability from information utilization. The third is to position information diagnosticity as a theoretical bridge. This position is a conceptual synthesis, not a claim of empirical validation.

11. Limitations

This study is an integrative literature review and therefore does not empirically test relationships among constructs. The HT-MIF cannot yet be treated as a validated model.

The literature differs in product, consumer, technology, and marketing contexts, so direct generalization should be undertaken cautiously.

12. Future Research Agenda

Future research can test the pathway Information Quality → Information Diagnosticity → Product Judgment → Product Evaluation → Marketing Response, with halal knowledge, religiosity, involvement, product category, perceived risk, and digital context as candidate boundary conditions. This pathway is a research proposition derived from the synthesis, not an empirical relationship established in this article.

Empirical research can also compare digital certification, QR-based verification, traceability platforms, and blockchain-based certification, while considering differences in information quality and diagnosticity from the consumer perspective.

CONCLUSION

Halal assurance technology can function as marketing information infrastructure when the information it facilitates is accessible to and used by consumers. The availability of halal information does not automatically mean that the information is used. Its value is influenced by information quality and characteristics, as well as consumer conditions and the context of use.

Information diagnosticity provides a conceptual perspective for explaining how information helps shape product judgment and product evaluation. The HT-MIF connects halal assurance technology, halal information, consumer information evaluation, information diagnosticity, product judgment, product evaluation, and marketing response.

The HT-MIF is not a new theory and has not been empirically tested. From an Islamic perspective, halal and tayyib, tabayyun, and clarity regarding halal, haram, and syubhat provide a normative foundation for the importance of information that can be verified and used responsibly. The article's main contribution is a conceptual explanation of the marketing function of halal assurance technology through information, rather than the direct effect of technology on consumer decisions.

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