

Utilization of AI-Driven Halal Compliance System in the Context of Regulatory Integration in the Digital Age (Study of the Application of Civil Liability Principles in Halal Product Guarantees)

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Abstract

The digital era has driven the integration of Artificial Intelligence (AI) into strategic sectors, including the Halal Product Assurance (HPA) system through the concept of an AI-Driven Halal Compliance System. This system offers efficient traceability and sharia compliance auditing, in line with the mandate of Law No. 33 of 2014 on HPA. This study aims to analyze the legal challenges arising from this integration, particularly regarding algorithmic audit errors that could harm consumers. Through a normative legal approach, this study identifies gaps in the traditional regime of Liability for Unlawful Acts (PMH) and Breach of Contract. It is suggested that consumer legal protection for halal causes requires the adaptation of civil law, namely through the application of the principle of Strict Liability supported by Multi-Layered Liability and the strengthening of AI SLA-based contracts. In addition, the BPJPH technical regulatory framework must adopt Alternative Regulatory Models, such as Regulatory Sandbox, and require Algorithm Transparency (Explainable AI/XAI) to ensure accountability in civil disputes.

Keywords: *Halal Product Guarantee, AI, Civil Law*

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2nd International Conference on Islamic Community Studies (ICICS)

Theme: History of Malay Civilisation and Islamic Human Capacity and Halal Hub in the Globalization Era

Introduction

The global halal product sector continues to grow rapidly, making it a market of strategic and ethical value, especially for Indonesia, which aspires to become the world's halal center. The legal framework for Halal Product Assurance (JPH) in Indonesia is reinforced by Law No. 33 of 2014, which requires halal certification for all products circulating in its territory. The demands for efficiency, speed, and accuracy in this certification process are becoming increasingly urgent due to the complexity of the global supply chain and the increase in product volume, which are difficult to handle with manual audit mechanisms.

The integration of AI into JPH through the AI-Driven Halal Compliance System is an inevitable innovative solution. AI is capable of processing big data from raw materials, verifying sources (through blockchain or IoT technology), and conducting real-time crosscontamination risk analysis. However, behind this efficiency lie significant legal challenges.

AI, as a non-human autonomous entity, cannot be held criminally or civilly liable in the same way as humans. When an AI system makes an audit error (for example, incorrectly verifying the halal status of ingredients or processes) that results in consumer losses, the existing legal system, particularly Indonesian Civil Law, faces an impasse. The traditional regime of liability for unlawful acts (PMH) and breach of contract is difficult to apply because it requires proof of “fault” on the part of the legal subject.

This study aims to analyze the integration of AI in SJPH and propose an alternative civil law framework that can guarantee consumer protection of halal causes in the digital era.

Literature Review 2.1 The Concept of Halal Product Guarantee (JPH) and Law No. 33 of 2014

JPH is legal certainty regarding the halal status of a product, as evidenced by a halal certificate. This concept encompasses two dimensions: Halal (permitted by Islamic law) and Thayyib (good, safe, and of high quality). Law No. 33 of 2014 emphasizes the responsibility of business actors to guarantee the halal status of products and places the BPJPH as the sole authorized authority. The Halal Product Guarantee System (SJPH), which must be implemented by business actors, is the main focus of audits, which are now increasingly moving towards data automation.

2.2 Integration of AI and Regulatory Compliance

AI-Driven Compliance refers to the use of AI to automate monitoring, reporting, and enforcement of regulatory compliance. In the context of halal, AI is used for:

- a) Supply Chain Traceability: Using Distributed Ledger Technology (DLT) to transparently record all production processes.
- b) Ingredient Verification: Analyzing massive amounts of raw material documents and data, including potential cross-contamination.
- c) Automated Auditing: Predictively assessing non-compliance risks without human intervention.

This integration, while efficient, creates a black box where algorithmic decision-making processes are difficult to understand, which is a source of legal accountability issues.

2.3 Indonesian Civil Law Liability Framework Indonesian civil law recognizes two main types of liability:

- a) Breach of Contract: Regulated in Article 1238 of the Civil Code, requiring the existence of a breached agreement. In this case, AI breach of contract occurs if there is a violation of the AI SLA agreed upon between the business operator and the system provider.
- b) Unlawful Acts (PMH): Regulated in Article 1365 of the Civil Code, this requires the elements of fault (schuld), loss, and causality. It is this element of fault that is the main obstacle in demanding liability for incorrect AI decisions. AI cannot consciously commit a fault.

2.4 Review of Alternative Liability Concepts in Technology Law

To address the PMH gap, global legal literature has proposed two key concepts:

- a) Strict Liability: A principle that allows victims to claim compensation without having to prove fault on the part of the responsible party. This principle is generally applied to high risks (e.g., defective products) and is highly relevant to AI.
- b) Multi-Layered Liability: A model that distributes liability proportionally to all parties in the AI value chain (developers, integrators, and users)¹⁰.

Research Methodology 3.1 Type and Approach of Research

This research uses normative legal research supported by a limited sociological approach. The normative legal approach focuses on the study of legal doctrine, legislation (JPH Law, Civil Code), and legal literature related to AI.

3.2 Sources and Types of Data

Primary (Normative) Data: Law No. 33 of 2014 concerning JPH, Civil Code, and BPJPH implementing regulations.

3.3 Data Analysis Techniques

Data is processed through qualitative data analysis, such as categorization and theme or pattern development (e.g., patterns of legal gaps and patterns of consumer protection needs), which are then presented in the form of rich and interpretive narratives. Legal analysis is conducted through extensive interpretation, analogy, and legal comparison (with European AI regulations) to propose civil law reforms.

Results 4.1 Empirical Context

There is a literacy gap between the concept of *halalan thayyiban* and the understanding of the role of technology. Socialization has successfully increased participants' practical knowledge in distinguishing between products that are only *thayyib* and products that are explicitly *halal*. This finding reinforces the urgency of AI regulation, because without basic understanding, the public will be highly dependent on AI certification outputs, making them very vulnerable to algorithmic errors. The success of the socialization shows that increasing literacy is an absolute prerequisite for the implementation of fair technology.

4.2 The Issue of Responsibility for Algorithm Audit Errors

Algorithm errors that result in the issuance of incorrect *halal* certificates (e.g., the presence of non-*halal* ingredients) can be categorized as PMH that harms consumers. However, claiming compensation based on Article 1365 of the Civil Code is hampered by the element of fault. It is impossible to prove that AI is “at fault” or “negligent.” The parties that can be sued are the developers, operators, or owners of AI. The problem is that developers can argue that the error was caused by data bias, unavoidable bugs, or incorrect input data due to the input

process of business actors. Liability becomes unclear, and consumers as victims are in a very weak position to prove where the fault lies in the AI value chain.

4.3 Legal Gaps Regarding the Autonomous and Black Box Nature

AI Modern AI systems, particularly deep learning, operate as black boxes. While explainable AI (XAI) attempts to address this, AI decision-making mechanisms remain complex. In civil disputes, this difficulty in proving the truth violates the principle of procedural fairness. Consumers cannot access or understand the basis for audit decisions issued by AI systems, leaving them unable to adequately argue for compensation.

4.4 Analysis of the Application of Alternative Civil Law Liability Principles To fill the legal gap and protect JPH consumers, it is necessary to consider adopting alternative liability principles that are appropriate to the nature of the technology.

- a) **Strict Liability** Implementing the Strict Liability principle is the most effective measure. AI in JPH, especially those used for critical verification, can be categorized as a highrisk activity or product. Mistakes in halal certification have not only financial but also theological and emotional impacts on Muslim consumers. Through Strict Liability, consumers only need to prove three elements (a) loss suffered (e.g., financial loss or breach of confidence)
 - b) the existence of a halal certificate that is proven to be false; and
 - c) a causal relationship between the incorrect certificate and the loss. The burden of proving error is removed from the algorithm, making it easier for consumers to obtain compensation.
- b. Multi-Layered Liability** While strict liability guarantees compensation for consumers, this model must be integrated with multi-layered liability for fairness among the responsible parties. Responsibility should be distributed in a hierarchical manner
- 1) Layer 1 (Primary): Business Actors (certificate owners and AI users).
 - 2) Layer 2 (System): Technology Provider/AI Developer (responsible for system design and bugs).
 - 3) Layer 3 (Regulator): BPJPH (responsible for monitoring and validating algorithms).

If consumers demand compensation through strict liability from business actors, the business actors can file an indemnity lawsuit against Layer 2 or Layer 3 to claim their share of the responsibility.

4.5 New Legal Obligations in 6XAI and Civil Clauses To ensure accountability, the adaptation of the Civil Code must include two new obligations:

- a) **Algorithmic Transparency (Explainable AI/XAI):** It is mandatory for AI decisions to be accountable and auditable in civil disputes. BPJPH technical regulations must require LPH to maintain an independently auditable log of algorithmic decisions.
- b) **Strengthened Civil Law Clauses:** Algorithmic disputes should be included in civil law contracts between businesses and technology providers, for example through AI SLAs. These clauses should define minimum AI performance standards and a prompt and transparent dispute resolution mechanism (arbitration or district court).

4.6 Implementation of BPJPH Regulatory Sandbox

For proper and secure integration, the BPJPH technical regulatory framework must adopt an Alternative Regulatory Model, namely Regulatory Sandbox. This model allows innovators (AI developers) to test their systems in a controlled and limited environment under BPJPH

supervision before the systems obtain official permission for halal certification. The objectives of the Sandbox are to:

- a) Identify legal risks and weaknesses (such as algorithmic bias) before the system affects the market.
- b) Develop accountable technical standards (benchmarking).
- c) Provide legal certainty for AI products themselves.

7. Establishment of the JPH AI Ethics and Legal Committee

BPJPH needs to establish a JPH AI Ethics and Legal Committee. This committee will function as an independent oversight body to:

- a) Assess the ethical and legal implications of AI implementation in halal auditing.
- b) Act as a mediator or technical arbitrator in civil disputes involving algorithmic decisions.
- c) Formulate Halal AI Ethics standards that are integrated into the SJPH. This committee will ensure that AI is not only technically compliant, but also ethically and sharia compliant.

Conclusion

1. The integration of an AI-driven Halal Compliance System in JPH has great potential for efficiency, but it poses serious challenges to the Indonesian Civil Law regime, which requires the element of “fault” in PMH. Legal protection for consumers regarding halal causes requires adaptation by adopting the principles of Strict Liability and Multi-Layered Liability to distribute responsibility fairly.
2. New legal obligations related to Algorithm Transparency (XAI) and contract reinforcement through AI SLAs are needed to ensure accountability in civil disputes. BPJPH needs to adopt a Regulatory Sandbox and form an AI JPH Ethics and Legal Committee to create legal certainty and proactively oversee AI implementation.

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