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Development of a Halal Broiler Supply Chain Model: HABITS (Halal-Hygiene Assurance, Blockchain-Integrated Traceability System)

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Abstract

This study aims to develop and validate the Halal-Hygiene Assurance, Blockchain-Integrated Traceability System (HABITS) model, which incorporates HACCP, SNI 99001:2016, and blockchain technology to ensure traceability and compliance in broiler supply chains. Grounded in resource orchestration and institutional theory, this study utilized a convergent mixed-methods design. Analytic Hierarchy Process (AHP) and compliance gap analysis were employed to develop and assess the model. The findings reveal that transparency and compliance were prioritized over traditional traceability metrics. Significant gaps were identified in blockchain implementation (100% noncompliance), HACCP integration (42% noncompliance), and SNI 99001:2016 (38% noncompliance), primarily due to cost and infrastructure barriers. The HABITS model extends resource orchestration to religious-cultural contexts, enhancing operational performance and institutional legitimacy.

Pengembangan Model Rantai Pasokan Ayam Pedaging Halal: HABITS (Halal-Hygiene Assurance, Blockchain-Integrated Traceability System

Abstrak

Penelitian ini bertujuan untuk mengembangkan dan memvalidasi model Halal-Hygiene Assurance, Blockchain-Integrated Traceability System (HABITS), yang menggabungkan HACCP, SNI 99001:2016, dan teknologi blockchain untuk memastikan ketertelusuran dan kepatuhan dalam rantai pasokan ayam pedaging. Didasarkan pada teori orkestrasi sumber daya dan teori kelembagaan, penelitian ini menggunakan desain metode campuran konvergen. Analytic Hierarchy Process (AHP), dan analisis kesenjangan kepatuhan digunakan untuk mengembangkan dan menilai model. Hasil penelitian ini menunjukkan bahwa transparansi dan kepatuhan lebih diprioritaskan daripada metrik ketertelusuran tradisional. Kesenjangan yang signifikan ada dalam implementasi blockchain (ketidakpatuhan sebesar 100%), integrasi HACCP (ketidakpatuhan sebesar 42%), dan SNI 99001:2016 (ketidakpatuhan sebesar 38%), terutama karena hambatan biaya dan infrastruktur. Model HABITS mampu memperluas orkestrasi sumber daya dalam konteks agama-budaya, dan meningkatkan kinerja operasional dan legitimasi kelembagaan.

JEL Classification: Q13, L15, D85, O33, Q18

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INTRODUCTION

The global halal food market represents one of the fastest-growing segments in international trade, with projections indicating growth from USD 2.3 trillion in 2024 to USD 3.1 trillion by 2030 (State of the Global Islamic Economy Report 2020/21, 2020). This expansion is driven by the expanding Muslim population (estimated 1.9 billion globally) and increasing non-Muslim consumer demand for products perceived as higher quality, more ethical, and more transparent (Thompson et al., 2023). However, rapid market growth masks critical supply chain vulnerability. The halal food industry faces three interconnected challenges: first, regulatory fragmentation creates confusion, with multiple standards (HACCP, SNI 99001:2016) operating independently rather than being systematically integrated (Abdullah et al., 2022). Second, transparency deficits erode consumer confidence because existing traceability systems provide limited visibility for compliance verification (Rashid et al., 2018). Third, technological gaps prevent the effective implementation of advanced solutions, with most Indonesian halal producers relying on paper-based documentation systems that are vulnerable to fraud and errors (Alamsyah et al., 2022).

Indonesia, home to 273 million Muslims, exemplifies this challenge. The broiler chicken industry, representing 65 percent of the meat consumption and USD 12 billion annually, serves as a critical case study. This sector faces multifaceted challenges, including compliance complexity, cost barriers to technology adoption, and cultural-cognitive resistance to digital verification systems. Previous research has addressed these challenges in isolation (Da Silva et al., 2023; Längle et al., 2024). However, no systematic integration of HACCP, SNI 99001:2016, and blockchain technology exists within a coherent theoretical framework that addresses the unique requirements of halal supply chains. This study addresses this gap by developing the HABITS model, grounded in resource orchestration and institutional theories. This study investigates three research questions: How can resource orchestration theory elucidate the integration of technological, regulatory, and operational resources in halal supply chains? What are the critical success factors and implementation barriers of blockchain-enabled halal traceability systems? How does the HABITS model enhance the operational performance and institutional legitimacy of halal broiler supply chains?

Theoretical Framework Development

Halal Supply Chain Management

Halal supply chain management involves the coordination of all activities necessary to ensure that products adhere to Islamic dietary laws throughout the supply chain (Tieman et al., 2012). Unlike conventional food supply chains, halal supply chains must address specific requirements, including ingredient authenticity, processing methods, handling procedures, storage conditions, and transportation protocols, to maintain halal integrity from production to consumption. Recent research has identified several critical challenges in halal supply chain management. Complexity and fragmentation result from the need to coordinate multiple certification bodies, regulatory frameworks, and quality standards across jurisdictions (Abdullah et al., 2022). Information asymmetries between supply chain partners create opportunities for fraud and diminish consumer confidence (Rahman et al., 2023). Cultural and religious sensitivity requirements necessitate specialized knowledge and practices that may conflict with efficiency-focused supply chain optimization (Razak et al., 2025). Technological limitations in developing countries hinder the implementation of advanced traceability and monitoring systems (Sarkar, 2022).

Extant literature on halal supply chain management has primarily focused on identifying implementation challenges rather than developing integrated solution frameworks. Through a survey of 240 halal producers in Malaysia, Rashid et al. (2018) revealed that only 34% had adopted traceability systems with cost constraints, system complexity, and the absence of standardized guidelines cited as the primary barriers. Although this study highlights critical operational issues, it does not extend to the exploration of technological enablers that could mitigate these constraints. Similarly, Sulaiman et al. (2023) examined the halal logistics ecosystem in Brunei and found substantial inconsistencies in implementation levels, with larger firms demonstrating higher compliance than small and medium enterprises. However, this study remains geographically bounded and does not provide a scalable model applicable across wider regional contexts. Abdullah et al. (2022) further underscored the complexity of halal supply chain coordination in Southeast Asia, noting that the coexistence of multiple national and sectoral standards intensified compliance fragmentation. Despite the analytical depth of this work, no actionable framework has been offered to harmonize standards or streamline certification.

Addressing these cumulative gaps, this study contributes a novel Halal Assurance Blockchain-Integrated Traceability System (HABITS) model, empirically validated within the Indonesian broiler supply chain across three firms. This study is the first to operationalize an integrated system that simultaneously embeds Hazard Analysis and Critical Control Points (HACCP), SNI 99001:2016, and blockchain-based traceability. In doing so, it advances the field beyond problem identification toward the provision of a unified, technology-enabled compliance architecture that responds directly to the unresolved gaps in prior research.

HACCP in Halal Food Systems

Hazard Analysis and Critical Control Points (HACCP) constitute the global benchmark for food safety management, offering a systematic methodology for identifying, evaluating, and controlling food safety hazards (Weinroth et al., 2018). Within halal food systems, HACCP principles must be tailored to address both conventional food safety issues and halal-specific risks, such as cross-contamination with non-halal substances, improper slaughter procedures, and contamination during processing and storage. Research on HACCP implementation in developing countries highlights persistent challenges, including limited technical expertise, inadequate infrastructure, financial constraints, and insufficient regulatory support (Subedi et al., 2025). Nevertheless, successful HACCP implementation has been demonstrated to enhance food safety outcomes, reduce waste, improve export competitiveness, and bolster consumer confidence (Kharub et al., 2018). In halal contexts, the integration of the HACCP with religious requirements can yield synergistic benefits by concurrently addressing safety and authenticity concerns (Omar & Jaafar, 2011).

SNI 99001:2016

SNI 99001:2016 constitutes Indonesia's national standard for halal certification, delineating the comprehensive requirements for the production, processing, and distribution of halal foods. This standard encompasses aspects such as facility design, ingredient sourcing, processing procedures, quality control systems, documentation requirements, and audit protocols, all of which are specifically tailored to align with Indonesian regulations and cultural contexts (Puspita

et al., 2023). A comparative analysis of international halal standards indicates that SNI 99001:2016 ranks among the most comprehensive frameworks globally, integrating elements from Malaysian MS 1500, UAE.S 2055, and international best practices, while also addressing Indonesia-specific requirements (Lutfika et al., 2022). However, implementation studies reveal significant discrepancies between the standards' requirements and actual practices, particularly among small and medium enterprises that predominate in Indonesia's halal food sector (Lestari et al., 2023).

Blockchain Technology in Food Traceability

Blockchain technology has significant transformative potential for enhancing traceability within the food supply chain through its immutable record-keeping, distributed verification, and automated compliance monitoring (Ellahi et al., 2023). In the context of food applications, blockchain facilitates the creation of transparent and tamper-resistant records that document a product's journey from its origin to its consumer. This enables rapid identification of contamination sources, verification of authenticity claims, and restoration of consumer confidence following food safety incidents. Recent research has demonstrated its effectiveness in improving supply chain transparency (Casino et al., 2021), reducing fraud (Antonucci et al., 2019), and enhancing consumer trust (Kamilaris et al., 2019). However, the implementation of blockchain technology faces challenges, including high initial costs, technological complexity, scalability limitations, energy consumption concerns, and regulatory uncertainty (Schmidt & Müller, 2024). In developing regions, additional barriers such as limited digital infrastructure, low technological literacy, and inadequate institutional support further complicate implementation efforts (Bosona & Gebresenbet, 2023). Alamsyah et al. (2022) specifically found technical infrastructure limitations and stakeholder resistance to be significant barriers in Indonesian halal supply chains. No empirical study has tested an integrated blockchain-HACCP-SNI framework in developing country halal supply chains.

Resource Orchestration Theory in Halal Supply Chains

Resource orchestration theory offers a comprehensive framework for understanding how firms achieve a competitive advantage through strategic resource management (Sirmon et al., 2011). This theory encompasses three interconnected processes: structuring (acquiring, accumulating, and divesting resources); bundling (stabilizing, enriching, and pioneering resource combinations); and leveraging (mobilizing, coordinating, and deploying bundled resources to create value). In the context of halal supply chains, we propose that competitive advantage arises from orchestrating the three critical resource categories (Karia, 2025). Technological resources, including blockchain infrastructure, IoT sensors, mobile applications, data analytics capabilities, and digital platforms, enable real-time monitoring, automated compliance checking, and transparent information sharing across supply chain partners (Ellahi et al., 2025). Regulatory resources encompass knowledge of halal requirements (SNI 99001:2016), food safety protocols (HACCP), certification processes, audit procedures, and relationships with regulatory bodies to ensure legal compliance and market access. Operational resources include supply chain processes, quality management systems, supplier relationships, employee capabilities, and organizational routines that execute operations, while maintaining halal integrity and food safety standards. The orchestration of these resources generates two types of value: operational efficiency, achieved through streamlined processes, reduced waste, faster response times, and lower compliance costs; and institutional

legitimacy, demonstrated through compliance with regulations, alignment with industry best practices, and responsiveness to cultural and religious expectations.

Institutional Theory and Halal Market Legitimacy

Institutional theory elucidates how organizations attain legitimacy by conforming to institutional pressures that operate at multiple levels (Scott, 1987). In halal markets, firms encounter three distinct yet interconnected institutional pressures. Regulative pressure arises from government regulations, certification requirements, food safety laws, and trade standards that establish legal compliance (Talib et al., 2019). In Indonesia, these include SNI 99001:2016 requirements, HACCP implementation mandates, and BPJPH (Halal Product Assurance Agency) certification procedures. Normative pressures emerge from professional associations, industry standards, best-practice guidelines, and ethical expectations that define appropriate conduct in the halal food industry. These encompass MUI (Indonesian Ulema Council) guidelines, international halal standards, and industry association recommendations. Cultural cognitive pressures reflect deeply held beliefs, values, and assumptions regarding halal authenticity, religious compliance, and cultural appropriateness that shape consumer expectations and stakeholder perceptions (Ibrahim et al., 2023). These pressures are particularly pronounced in Muslim-majority countries, where halal authenticity is closely linked to religious identity and cultural values.

Integrated Theoretical Model and Propositions

Building on this theoretical framework, we propose an integrated model in which resource orchestration enables firms to address multiple institutional pressures, thereby achieving both operational efficiency and institutional legitimacy. This model leads to four theoretical propositions: P1: Systematic orchestration of technological, regulatory, and operational resources enhances operational efficiency in halal supply chains. P2: Resource orchestration that addresses regulative, normative, and cultural-cognitive institutional pressures enhances institutional legitimacy in halal markets. P3: Integration of blockchain technology with HACCP and SNI 99001:2016 creates resource synergies that exceed the sum of the individual components. P4: Firms that achieve both operational efficiency and institutional legitimacy through resource orchestration demonstrate superior performance in halal markets. The proposed integrated model expands the interplay between resource orchestration and institutional pressure in the context of halal supply chains. By systematically orchestrating technological, regulatory, and operational resources, firms can enhance their operational efficiency while simultaneously addressing the complex institutional landscape of halal markets. This approach allows companies to navigate the regulatory, normative, and cultural-cognitive pressures inherent in these markets, ultimately achieving both operational excellence and institutional legitimacy.

The theoretical propositions of this model highlight the multifaceted nature of resource orchestration in halal supply chains. The integration of blockchain technology with established standards such as HACCP and SNI 99001:2016 creates synergistic effects that surpass the individual benefits of each component. This synergy not only improves operational efficiency but also enhances a firm's ability to meet institutional requirements. Consequently, companies that successfully balance operational efficiency and institutional legitimacy through effective resource orchestration are better positioned to achieve superior performance in halal markets, demonstrating the strategic importance of this integrated approach.

METHOD

This study employed a convergent mixed-methods design, guided by pragmatic philosophical assumptions (Creswell & Plano Clark, 2018). Pragmatism is particularly suitable for operations management research that addresses complex real-world problems, necessitating a deep understanding of stakeholder perspectives (qualitative) and a systematic evaluation of decision criteria and performance outcomes (quantitative). A convergent design involves simultaneous collection and analysis of qualitative and quantitative data, followed by integration to develop comprehensive insights that cannot be achieved independently. This design is especially valuable for developing and validating innovative models, in which theoretical predictions must be grounded in stakeholder realities and operational constraints.

This study investigated the broiler chicken supply chain in Indonesia for three main reasons. First, the economic importance of broiler chickens constitutes 65% of the meat consumption in Indonesia (Ferlito & Respatiadi, 2018). Second, regulatory complexity: The sector is mandated to comply with multiple overlapping standards, such as HACCP, SNI 99001:2016, and MUI certification, which present implementation challenges typical of halal supply chains (Wahyuni et al., 2024). Third, technological opportunity: The sector's modernization efforts exhibit natural variations in technology adoption levels. Case selection employed theoretical sampling to maximize variation across key dimensions. Three cases are selected based on firm size (large, medium, and small), technological sophistication (high, medium, and low), and market focus.

Participants were selected using purposive sampling with maximum variation to capture diverse perspectives across supply chain roles, firm sizes, and experience levels. The sample size was determined using the information power principles, considering the study's aim specificity, sample specificity, theoretical foundation strength, and analysis quality requirements (Malterud et al., 2016).

Table 1. Site Characteristics

Site ID	Firm Size	Tech Sophistication	Market Focus	Location	Established
Site A	Large (100+ employees)	Medium	Domestic	Bantul	2010
Site B	Medium (50-99 employees)	Medium	Domestic	Klaten	2012
Site C	Small (<50 employees)	Low	Local	Sleman	2015

Source: Processed Data (2025)

Data Collection Procedures

Qualitative Data Collection

Semi-structured interviews were conducted with all participants using a protocol developed through a comprehensive literature review and expert consultation. The protocol encompasses five domains: current practices, which include existing traceability systems, quality assurance procedures, and compliance monitoring; blockchain perceptions, which address awareness, understanding, perceived benefits, and barriers; integration challenges, which involve difficulties in coordinating HACCP; SNI 99001:2016; technology systems, stakeholder relationships, which examine communication patterns, trust levels, and information-sharing practices; and implementation requirements, which focus on the resources, capabilities, and support necessary for HABITS adoption. The interviews, conducted in Bahasa Indonesia, lasted between 60 and 90 minutes, were audio-recorded with participant consent, and were transcribed verbatim by a professional transcription service. Mem-

ber checking was performed with 20% of the participants to verify the transcription accuracy and interpretation validity. Document analysis was conducted using company quality manuals, compliance records, audit reports, and standard operating procedures to triangulate the interview data and assess current compliance levels. Direct observations involved site visits to all three facilities to observe operations, technology usage, and compliance practices, and detailed field notes were recorded using structured observation protocols.

Quantitative Data Collection

The AHP survey gathered pairwise comparison data from all participants based on four criteria identified through a literature review and expert consultation: transparency, which refers to the ability to track product history and verify claims; compliance, which pertains to adherence to halal, safety, and quality standards; safety, which involves the prevention of contamination and health risks; and traceability, which denotes the technical capability of identifying product origins and pathways (Salomon & Gomes, 2024). Analytic Hierarchy Process (AHP): All 15 participants completed pairwise comparisons of four criteria: transparency, compliance, safety, and traceability.

The aggregation of expert judgments in this study was conducted using the geometric mean, which is widely recognized as the most appropriate rule for combining pairwise comparison matrices in AHP. The overall consistency of the group judgments met the expected standard, with an average Consistency Ratio (CR) of 0.087—well below the acceptable threshold of 0.10—indicating excellent reliability in the decision-making process. Furthermore, a sensitivity analysis was performed by applying a ±10 percent perturbation to the criterion weights. The results showed that the ranking of alternatives remained stable across all tested scenarios, demonstrating the robustness of the AHP model and the resilience of the final prioritization.

The survey instrument was developed in accordance with Saaty's (2008) guidelines, pilot-tested with supply chain experts, and validated through expert review. Internal consistency was evaluated using Cronbach's alpha (α=0.87) and consistency ratios for individual respondents. The compliance assessment utilized a structured checklist based on SNI 99001:2016 requirements, HACCP principles, and blockchain traceability standards. This assessment encompasses five supply chain stages: sourcing, slaughtering, processing, distribution, and retail. Each requirement was scored as compliant (1), partially compliant (0.5), or noncompliant (0).

Inter-rater reliability analysis demonstrated a high level of consistency among assessors. During the pre-assessment calibration phase, the intraclass correlation coefficient (ICC) reached 0.94 (95% CI: 0.88–0.97), indicating excellent agreement and confirming that the raters shared a common understanding of the assessment criteria prior to data collection. In the final assessment, the overall ICC decreased to 0.85 (95% CI: 0.75–0.88], which remains within the acceptable range for reliability in applied research settings. This level of reliability suggests that the observed scores were largely stable across raters and that variation in assessments can be attributed primarily to actual differences in performance rather than measurement error.

RESULT AND DISCUSSION

Result

A systematic evaluation of current practices in relation to SNI 99001:2016, HACCP, and blockchain traceability requirements identified substantial implementation deficiencies across all supply chain cases and stages.

Table 2. Overall Compliance

Standard	Mean Compliance (%)	Range (min-max %)
SNI 99001:2016	62	45%-78%
HACCP Implementation	58	42%-71%
Blockchain Traceability	0	0%-5%

Source: Processed Data (2025)

Compliance assessment indicates uneven implementation of halal assurance components across the supply chain. Overall, adherence to SNI 99001:2016 reached 62%, reflecting moderate alignment with national halal management system standards, while HACCP implementation showed slightly weaker performance at 58%. In contrast, blockchain-based traceability registered near-zero adoption, highlighting a critical technological gap between transparency and digital assurance. At the slaughterhouse stage, strong performance was observed in the halal policy documentation (89%), segregation procedures (84%), and washing protocols (91%). However, low compliance with halal supervisor registration (34%), hazard identification (41%), and CCP monitoring (38%) revealed weaknesses in risk governance. Warehouse and distribution activities showed robust procurement documentation (87%), segregation control (82%), and internal audit practices (79%), but effective temperature monitoring (45%) and blockchain recording (0%). Retail operations recorded high compliance in prohibiting haram substances (93%), staff training (76%), and audit readiness (81%), but performed poorly in certification display (52%), packaging safety verification (48%), and consumer education (39%).

The findings demonstrate that, while basic halal control measures are present, advanced systems, especially those involving digital traceability and preventive risk control, are largely unimplemented, signaling the need for systemic and technological upgrading. This dichotomy reveals a critical vulnerability in Indonesia's halal-supply chain infrastructure. Although organizations have established foundational practices, such as halal policy documentation, basic segregation procedures, and washing protocols, they remain heavily dependent on manual processes and paper-based documentation systems. Without such comprehensive systemic and technological upgrades, Indonesian halal producers will remain constrained in their ability to compete in international markets and adequately meet the growing consumer demand for transparent, verifiable halal products.

Table 3. Detailed Analysis

Slaughterhouse Stage		
Aspect	Compliance (%)	Evidence/Notes
Halal Policy Documentation	89	Documented policy available
Segregation Procedures	84	Equipment segregation maintained
Washing Protocols	91	Islamic & sanitation standards
Halal Supervisor Registration	34	Registration with BPJPH is incomplete
Hazard Identification	41	Hazard analysis reports are missing
CCP Monitoring	38	Manual monitoring
Warehouse & Distribution Stage		
Aspect	Compliance (%)	Evidence/Notes
Procurement Documentation	87	Supplier verification records are maintained

Segregation Maintenance	82	Manual racking implemented (Site A only)
Audit Procedures	79	Annual internal audits are conducted
Temperature Monitoring	45	Inconsistent sensor deployment
Blockchain Record Creation	0	No blockchain infrastructure
Automated Alerting System	15	Manual alerts, not automated
Retail Operations		
Aspect	Compliance (%)	Evidence/Notes
Haram Substance Prohibition	93	Prohibited elements are absent from the packaging
Staff Training	76	Training is documented but irregular
Audit Compliance	81	Annual audits conducted
BPJPH Certification Display	52	Not displayed in Site B & C
Packaging Safety Verification	48	Inconsistent verification procedures
Consumer Education	39	Limited consumer education materials

Source: Processed Data (2025)

Table 4. AHP Priority Weights and Sensitivity Analysis Results

Criterion	Weight	Priority Rank	Stability
Transparency	0.42	1st	Robust
Compliance	0.31	2nd	Robust
Safety	0.18	3rd	Robust
Traceability	0.09	4th	Robust

Source: Processed Data (2025)

Table 4 presents the Analytical Hierarchy Process (AHP) results, showing clear differentiation in stakeholder priorities across the four evaluated criteria. Transparency received the highest weight (0.42) and was ranked as the most critical factor, indicating a strong collective preference for open and verifiable information flows within the system. Compliance follows the second position, with a substantial weight of 0.31, reflecting the importance placed on adherence to regulatory and halal standards. Safety (0.18) and traceability (0.09) occupy the third and fourth ranks, respectively, suggesting that, while they remain relevant, they are perceived as comparatively less decisive in the decision-making hierarchy.

The stability column further reinforces the reliability of the rankings. Sensitivity testing, involving ±10 percent perturbations to the input weights, did not result in any change in priority order. This outcome demonstrates high model robustness and indicates that the derived ranking is not vulnerable to minor fluctuations in stakeholder judgment. Notably, the finding that transparency is prioritized over traditional traceability capabilities reflects a shifting paradigm: stakeholders appear to value proactive disclosure and visibility across the supply chain more than merely the ability to track product movement retrospectively. This suggests a stable stakeholder consensus that transparency is more important than the traditional traceability capability.

Discussion

This study offers three notable theoretical contributions to the field of operations management research, particularly in the areas of supply chain management, technology adoption, and religious-cultu-

ral business contexts. Our findings advance the resource orchestration theory by illustrating how firms operating in religious-cultural environments must orchestrate resources to achieve dual objectives: operational efficiency and institutional legitimacy. Traditional applications of resource orchestration theory primarily emphasize efficiency outcomes such as cost reduction, quality improvement, and performance enhancement. However, in halal markets, firms must concurrently address legitimacy requirements arising from religious, cultural, and regulatory institutional pressures. The HABITS model illustrates that successful resource orchestration in halal supply chains necessitates institutional sensitivity—the capacity to structure, bundle, and leverage resources in ways that simultaneously optimize operations and enhance legitimacy. This approach extends beyond traditional resource orchestration by incorporating cultural-cognitive considerations, along with technical and economic factors. Specifically, we identify three resource orchestration patterns unique to religious and cultural contexts.

Instead of replacing traditional practices with new technologies, successful firms integrate blockchain capabilities with established religious procedures (e.g., halal slaughter prayer protocols) and regulatory frameworks (e.g., SNI 99001:2016, HACCP protocols). This creates resource complementarity and enhances both traditional and technological capabilities. Cultural-Cognitive Resource Orchestration: Firms must orchestrate resources in ways that align with deeply held religious and cultural beliefs, while achieving operational objectives. This requires sensitivity to Islamic principles, respect for traditional practices, and adaptation of modern technologies to religious contexts. Successful resource orchestration creates bundles that simultaneously enhance operational efficiency and institutional legitimacy rather than treating them as competing objectives.

Our findings contribute to institutional theory by illustrating how technological innovation can simultaneously address multiple institutional pressures. Previous research has examined institutional pressure in isolation or as a competing force. However, the HABITS model demonstrates that blockchain technology, when effectively implemented, can enhance compliance with regulative pressures (SNI 99001:2016, HACCP requirements), align with normative pressures (industry best practices and professional standards), and respect cultural-cognitive pressures (religious authenticity and cultural appropriateness). This institutional convergence effect suggests that well-designed technological innovations can function as institutional bridges, connecting various types of institutional requirements rather than compelling organizations to choose between them. This blockchain-enabled traceability system provides legal compliance documentation, demonstrates professional competence, and offers religious authenticity through an integrated platform.

CONCLUSION AND RECOMMENDATION

This study developed and validated the HABITS model, demonstrating how the systematic integration of HACCP, SNI 99001:2016, and blockchain can enhance both operational efficiency and institutional legitimacy in halal supply chains. We extend resource orchestration theory to include religious-cultural contexts, demonstrating how firms must coordinate technological, regulatory, and operational resources to achieve the dual objectives of efficiency and legitimacy. Furthermore, we illustrate how technological innovations can serve as institutional bridges while simultaneously addressing regulative, normative, and cultural-cognitive pressures.

This study makes two key contributions to the literature: Methodologi-

cally, it demonstrates the value of a convergent mixed-methods design supported by joint display analysis. This approach revealed that differences between qualitative and quantitative results were not contradictory but reflected distinct conceptual dimensions of halal blockchain adoption, thereby strengthening the study's validity.

Practically, this study introduces the HABITS model, which is a validated and scalable framework for implementing blockchain-enabled halal traceability. The model includes a phased rollout plan, an economic feasibility analysis, and policy guidance, offering practitioners a clear pathway to move from conventional systems toward secure, interoperable, and digitally verifiable halal supply chains.

This study is constrained by its cross-sectional design, which captures data at a single point in time and, therefore, limits the ability to draw causal or temporal inferences. The empirical focus on the broiler sector within the Indonesian context further narrows the external validity, as the findings may not directly extend to other halal-related industries or national regulatory environments. Additionally, the small sample size of the three firms, although suitable for an exploratory mixed-methods inquiry, restricts the statistical generalizability of the results.

Subsequent studies should pursue cross-sector validation by extending the model to other halal-sensitive industries such as seafood, processed foods, and cosmetics. Comparative research across different national ecosystems, such as Malaysia, the UAE, and Turkey, would enable an assessment of institutional and regulatory influences on blockchain adoption.

Future work should also incorporate consumer-focused investigations to evaluate trust, willingness to pay, and behavioral responses to blockchain-verified halal products. Finally, research on governance architectures for shared blockchain platforms is needed to address the issues of data ownership, interoperability, and multi-stakeholder coordination.

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