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Integrating Waqf and Halal Supply Chain Management: A Novel Framework for Sustainable SMEs Ecosystem in Emerging Markets

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Abstract:

Micro, Small, and Medium Enterprises (SMEs) in emerging markets face persistent operational challenges, including limited access to affordable capital and fragmented supply chain traceability. While the global demand for halal-certified products continues to rise, small-scale producers often struggle to achieve compliance due to high certification costs and weak logistic infrastructure. This study proposes an integrative conceptual framework combining Islamic social finance (*Waqf*) with modern Halal Supply Chain Management (HSCM) to construct a self-sustaining ecosystem for SMEs. Grounded in Resource-Based View (RBV) and Institutional Theory, the research utilizes a Mixed-Methods Sequential Exploratory design. Phase one conducts semi-structured qualitative interviews with 24 key stakeholders (Islamic scholars, waqf managers, halal certifiers, and SME owners) to identify structural bottlenecks. Phase two employs Partial Least Squares Structural Equation Modeling (PLS-SEM) on survey data from 380 halal SME owners. Findings indicate that productive waqf assets—when allocated as physical infrastructure (certified cold chains, shared processing facilities) and revolving liquid capital—significantly enhance supply chain

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integrity and operational resilience. Furthermore, the integration of waqf-backed supply chains exerts a strong positive influence on halal certification compliance and firm performance. Institutional support acts as a crucial moderating variable that amplifies the relationship between waqf utilization and supply chain sustainability. This paper offers practical insights for policymakers, waqf institutions, and SME managers seeking to leverage Islamic social finance for sustainable economic development.

Keywords:
Waqf, Halal Supply Chain Management, SMEs, Islamic Social Finance, Sustainable Ecosystem, PLS-SEM.

Introduction

Micro, Small, and Medium Enterprises (SMEs) constitute the economic backbone of developing economies, driving job creation, poverty alleviation, and localized innovation. Within Muslim-majority nations and emerging global markets, the halal sector represents a rapidly expanding industry encompassing food, pharmaceuticals, cosmetics, and lifestyle products. However, despite favorable consumer demand, halal SMEs face significant structural barriers. Unlike large multinational corporations, small producers frequently encounter financing bottlenecks, high costs associated with halal certification, and inadequate logistics infrastructure required to guarantee supply chain integrity from farm to fork.

To preserve halal integrity, products must comply with strict Shariah guidelines, ensuring no cross-contamination with non-halal (*haram*) substances occurs during production, storage, transportation, and retail display. Establishing an end-to-end Halal Supply Chain Management (HSCM) system requires substantial capital investment in dedicated transport units, cold chain storage, quality testing, and digital tracking. For resource-constrained SMEs, these capital requirements are often prohibitive, leading to supply chain vulnerabilities and restricted market access.

Concurrently, conventional financial instruments remain unviable for many Islamic SMEs due to high interest rates (*riba*) and stringent collateral demands. In response, Islamic Social Finance specifically *Waqf* (charitable endowments) presents an underutilized

mechanism for sustainable development. Historically, waqf served as a key institutional driver for public infrastructure, education, and healthcare. In modern economic applications, productive waqf and cash waqf can be channeled into industrial assets, shared processing centers, and low-cost revolving financing pools tailored for small businesses.

Despite growing academic interest in both waqf mechanisms and halal logistics, existing literature treats these two domains in isolation. Research on waqf predominantly focuses on socio-religious governance or real estate development, while supply chain literature emphasizes technological integration (such as blockchain or IoT) within commercial corporations. Very few empirical studies investigate how waqf assets can be structurally integrated into supply chain management to relieve operational bottlenecks for halal SMEs.

To address this knowledge gap, this study develops and validates an integrative framework linking productive waqf assets, halal supply chain management, and SME sustainability. The primary objectives of this paper are:

1. To identify the structural mechanisms through which productive waqf can support halal supply chain operations for SMEs.
2. To empirically analyze the impact of waqf-integrated supply chains on halal compliance integrity and firm performance.
3. To evaluate the moderating role of institutional support (government policies and regulatory bodies) in enabling waqf-driven SME ecosystems.

Methods

This study adopts a Mixed-Methods Sequential Exploratory design divided into two sequential phases:

- **Phase 1 (Qualitative):** In-depth semi-structured interviews were conducted with 24 key industry informants, including waqf fund managers (*nazhir*), halal certification officers, supply chain experts, and SME executives. Qualitative thematic analysis was used to refine construct definitions and context-specific indicators.
- **Phase 2 (Quantitative):** A structural survey was distributed to test the conceptual model empirically using Partial Least Squares Structural Equation Modeling (PLS-SEM).

Population and Sampling

The quantitative target population comprised owner-managers of halal-certified or halal-oriented SMEs operating in the food and beverage manufacturing sector. A purposive sampling strategy yielded 380 valid questionnaire responses. The sample size satisfied all statistical power requirements for complex structural equations.

Construct Measurement and Variables

All constructs were measured using multi-item scales adapted from established literature on a 5-point Likert scale:

- **Productive Waqf Support (PWS):** Measured via 5 items assessing access to waqf-funded shared infrastructure, equipment leasing, and cash waqf revolving funds.
- **Halal Supply Chain Integrity (HSCI):** Measured via 5 items covering raw material traceability, dedicated transport, segregation protocols, and storage compliance.
- **SME Operational Resilience (SOR):** Measured via 4 items evaluating cost efficiency, risk mitigation, and continuous supply stability.
- **Firm Performance (FP):** Measured via 4 items capturing revenue growth, market share expansion, and customer trust.
- **Institutional Support (IS):** Measured via 4 items assessing regulatory clarity, government subsidies, and certification assistance.

Data Analysis Procedure

Quantitative data were processed using SmartPLS. The measurement model (outer model) was tested for indicator reliability, composite reliability ($CR > 0.70$), convergent validity (AVE > 0.50), and discriminant validity using the Heterotrait-Monotrait ratio (HTMT < 0.85). Subsequently, structural path relationships (inner model), mediation effects, and moderation effects were tested via bootstrapping with 5,000 resamples.

Result and Discussion

Measurement Model Evaluation (Outer Model)

Prior to evaluating structural path relationships, the reflective measurement model was rigorously tested to establish indicator reliability, internal consistency, convergent validity, and discriminant validity.

- **Indicator Reliability & Internal Consistency:** Outer loadings for all items across the five constructs (Productive Waqf Support, Halal Supply Chain Integrity, SME Operational Resilience, Firm Performance, and Institutional Support) exceeded the standard cutoff value of 0.708. Construct reliability was confirmed via Cronbach's Alpha (ranging between 0.824 and 0.891) and Composite Reliability (CR values ranging between 0.885 and 0.920), both well above the accepted threshold of 0.70.
- **Convergent Validity:** Average Variance Extracted (AVE) values for all constructs ranged from 0.615 to 0.710, comfortably surpassing the minimum benchmark of 0.50. This indicates that the constructs account for over 60% of the variance among their respective measurement items.
- **Discriminant Validity:** Verified using both the Fornell-Larcker criterion and the Heterotrait-Monotrait ratio of correlations (HTMT). All HTMT values remained strictly below the conservative threshold of 0.85, confirming distinct empirical independence between variables.

Structural Model Assessment (Inner Model)

Hypothesis testing was conducted using a non-parametric bootstrapping procedure with 5,000 resamples. Collinearity was ruled out as all inner Variance Inflation Factor (VIF) values ranged between 1.32 and 2.15, well under the critical threshold of 3.0.

The combined model demonstrated strong explanatory power, accounting for 64.2% of the variance in Firm Performance ($R^2 = 0.642$), 52.8% of the variance in Halal Supply Chain Integrity ($R^2 = 0.528$), and 41.5% of the variance in SME Operational Resilience ($R^2 = 0.415$). Cross-validated redundancy values (Q^2) were all well above zero, confirming robust predictive relevance.

Structural Path Results

1. **Direct Impact of Productive Waqf Support on Halal Supply Chain Integrity ($\beta = 0.485, t = 8.921, p < 0.001$):**

The empirical data strongly supports the hypothesis that access to productive waqf assets directly enhances halal supply chain integrity. Traditional small-scale producers often struggle to maintain strict

segregation of halal products during storage and transit due to high capital expenditures. When waqf institutions (Nazhir) provide shared infrastructure such as communal cold storage facilities, certified transport units, and low-cost equipment leasing—SMEs can seamlessly adhere to Shariah segregation guidelines without suffering severe margin compression.

2. **Impact of Supply Chain Integrity on Operational Resilience ($\beta = 0.382, t = 6.415, p < 0.001$) and Firm Performance ($\beta = 0.295, t = 5.112, p < 0.001$):**

Maintaining end-to-end halal traceability directly improves SME commercial metrics. Verified halal integrity acts as a signal of high quality and regulatory compliance, enabling SMEs to access formal retail networks and export markets. Furthermore, structured supply chain processes lower raw material wastage and operational friction, bolstering the overall resilience of small firms against market volatility.

3. **Direct Impact of Operational Resilience on Firm Performance ($\beta = 0.340, t = 5.884, p < 0.001$):**

SMEs that exhibit high operational adaptability and cost efficiency translate these internal capabilities into long-term financial growth, expanded market share, and higher customer retention.

Mediation and Moderation Analysis

Mediating Role of Supply Chain Resilience and Integrity

To understand how productive waqf support indirectly translates into financial performance, mediation analyses were conducted.

The indirect path from Productive Waqf Support to Firm Performance mediated through Halal Supply Chain Integrity was highly significant ($\beta = 0.143, t = 4.210, p < 0.001$). A sequential dual-mediation path running from Waqf Support → Supply Chain Integrity → Operational Resilience → Firm Performance was also confirmed ($\beta = 0.063, t = 3.125, p = 0.002$).

These results confirm **complementary partial mediation**. Productive waqf acts as an catalyst: it does not simply hand out passive capital, but builds structural operational capabilities (supply chain compliance and resilience) that ultimately drive firm profitability.

Moderating Effect of Institutional Support ($\beta = 0.162, t = 3.650, p < 0.001$)

The interaction term (Productive Waqf Support × Institutional Support) exerted a statistically significant positive effect on Halal Supply Chain Integrity.

Slope analysis reveals that when government agencies, halal certification bodies, and waqf regulatory authorities provide strong institutional backing (clear legal frameworks, subsidized certification audits, and standardized waqf governance), the positive impact of waqf assets on supply chain integrity is greatly amplified. Institutional support eliminates regulatory ambiguity and ensures that waqf capital is directed specifically toward certified, high-impact supply chain projects.

Discussion and Policy Implications

The findings of this study offer vital theoretical and managerial insights into the integration of Islamic social finance with commercial supply chain management.

Theoretical Contributions

This study bridges a key literature gap by integrating the Resource-Based View (RBV) with Institutional Theory within an Islamic economics framework. While traditional RBV focuses on firm-owned tangible and intangible assets, this paper demonstrates that "shared institutional assets"—specifically those funded by social endowments like Waqf—can serve as valuable, rare, and non-substitutable resources for cash-strapped SMEs. Furthermore, the results prove that social finance mechanisms can be systematically combined with commercial supply chains to create self-sustaining economic ecosystems.

Strategic & Managerial Recommendations

1. **Strategic Shift for Waqf Managers (Nazhir):** Waqf institutions must move away from traditional, passive asset management (such as holding static real estate or mosques) toward active, productive economic investments. Establishing dedicated Halal Industrial Parks, shared processing hubs, and specialized cold chains for

SMEs generates both social welfare and recurring commercial yields.

2. **Cooperative Alliances for SMEs:** Rather than attempting to finance expensive logistics individually, small business owners should form regional industry clusters or cooperatives to jointly utilize waqf-backed infrastructure and liquid revolving funds.
3. **Integrated Public Policy Frameworks:** Governments in emerging markets should align waqf regulatory policies with national halal industry roadmaps. Tax incentives and streamlined audit procedures should be provided to waqf bodies that actively invest in public SME supply chain infrastructure.

Conclusion

This research presents a validated structural model demonstrating how the strategic integration of Productive Waqf and Halal Supply Chain Management creates a resilient, self-sustaining ecosystem for micro, small, and medium enterprises (SMEs) in emerging markets. By evaluating empirical data from 380 halal SME owners, the study proves that productive waqf assets—when deployed as shared physical infrastructure (certified storage, processing equipment, and specialized transport) and non-interest revolving capital—directly resolve the chronic financial and logistics bottlenecks faced by small producers. This structural support directly enhances halal supply chain integrity, builds operational resilience against economic disruptions, and drives overall business growth. Moreover, institutional support acts as a vital catalyst, maximizing the efficiency with which waqf capital is deployed across the supply chain.

Proves that Islamic social finance tools are not limited to passive poverty relief, but can be utilized as dynamic economic assets to build competitive supply chain capabilities under the Resource-Based View framework. Demonstrates a practical model where waqf institutions, halal regulatory bodies, and SME cooperatives collaborate to lower halal certification costs and secure end-to-end supply chain compliance.

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