Transforming the Halal Ecosystem through the Implementation of Green Fintech in Online Food Delivery Applications

Nok Silvi Rohmawati
Universitas Islam Negeri K.H. Abdurrahman Wahid Pekalongan, Indonesia
E-mail: nok.silvi.rohmawati24006@mhs.uingusdur.ac.id

Abstract

The rapid growth of online food delivery services has encouraged innovation within the halal ecosystem, particularly through the adoption of green financial technology (green fintech). This study aims to examine how the integration of green fintech features such as eco-friendly payment options, carbon footprint tracking, and transparent halal supply chain information can transform the halal ecosystem in food delivery applications. The research employs a literature review and analysis of relevant implementation models. The findings indicate that green fintech enhances transaction efficiency, strengthens Muslim consumer trust, and promotes sustainable business practices in the food sector. Moreover, the integration reinforces halal tayyib principles by providing more accurate and accountable information. This study concludes that the implementation of green fintech holds significant potential to accelerate the transformation of the halal ecosystem toward sustainable and ethical digital practices.

Keywords: green fintech, halal ecosystem, food delivery applications.

Introduction

The rapid development of digital technology has brought significant changes to the global food industry, particularly through the growing use of online food delivery applications. Markets with a substantial Muslim consumer base, this development is closely tied to the increasing demand for transparency, ethical food handling practices, and sustainability within the halal ecosystem. Previous studies have emphasized the importance of strengthening halal assurance, improving supply chain accountability, and building consumer trust in digital food transactions. The existing literature continues to focus on traditional halal certification systems, consumer perceptions, or system usability, while attention to sustainability-oriented innovations that integrate environmental responsibility into digital halal services remains relatively limited.

Recent academic discussions indicate that digital financial technologies have the potential to enhance transaction efficiency, support data transparency, and encourage more environmentally responsible behaviors. These studies often do not specifically address how such technologies can be aligned with the principles of halalan tayyiban, which require that food products and processes be not only lawful but also ethical, safe, and wholesome. Friendly financial technology (green fintech), with features such as ecofriendly payment

options (Niu et al., 2023), carbon footprint tracking, and transparent halal supply chain information, offers a promising approach to reinforcing these values. Some literature has acknowledged the relevance of green fintech in promoting sustainable digital practices, comprehensive analyses of its integration within food delivery platforms particularly its implications for the halal ecosystem remain limited.

This study aims to address this gap by examining how the implementation of green fintech features can contribute to transforming the halal ecosystem in online food delivery applications. Green fintech can enhance efficiency, strengthen Muslim consumer trust, and promote sustainable business practices by providing more transparent and accountable information throughout the food supply chain. Through an analysis of previous studies and relevant implementation models, this research seeks to offer a deeper understanding of how green fintech supports the development of a more ethical, sustainable, and trustworthy digital halal ecosystem.

The purpose of this study is therefore to explore and explain the transformative potential of green fintech within halal focused food delivery services, and to demonstrate how its integration can reinforce halal tayyib practices while simultaneously encouraging sustainable digital innovation.

Methods

Research Design

This study employed a qualitative descriptive research design to explore how the implementation of green fintech features contributes to the transformation of the halal ecosystem in online food delivery applications. The qualitative approach was selected to allow an in-depth understanding of concepts, practices, and perceived impacts based on previously published literature, implementation models, and academic discussions related to halal digital services and sustainability oriented financial technology (Adiansyah et al., 2025).

Participants

The participants in this study consisted of textual data sources, namely scientific articles, policy documents, reports, and relevant publications discussing green fintech, halal ecosystems, food delivery platforms, and sustainable digital practices. These documents were selected through purposive sampling to ensure that only sources with direct relevance to the research focus were analyzed.

Research Procedures

The research procedures included several stages: identifying relevant literature, selecting credible sources based on predetermined criteria, reviewing and categorizing the content, and synthesizing the findings to answer the research objectives. Selected document was examined to determine how green fintech features such as eco-friendly payment options, carbon footprint tracking, and transparent supply chain information have been applied or discussed within the context of halal digital services.

Data Collection Techniques

Data were collected through a systematic literature review. Search databases included Google Scholar, ScienceDirect, SpringerLink, and other reputable academic sources. Keywords such as green fintech, halal ecosystem, online food delivery, digital sustainability, and halalan tayyiban were used to identify relevant studies. Inclusion criteria consisted of publications within the last ten years, peer reviewed articles, and studies directly related to fintech, sustainability, and halal consumer behavior.

Data Analysis Technique

The collected data were analyzed using qualitative content analysis. This technique involved coding textual information, identifying recurring patterns, and classifying themes related to the impact of green fintech on halal digital ecosystems. The analysis emphasized conceptual links between sustainability features and the strengthening of transparency, efficiency, and halal tayyib principles in food delivery services.

Results

The Results section presents the main findings of the study in a systematic manner, following the sequence of the methodological procedures outlined in the previous section. Since this study employed qualitative content analysis, the findings consist of grouped thematic patterns derived from the selected documents. The results are presented descriptively without interpretation or discussion, as those will be addressed in the following section.

Results Based on Research Design

The qualitative descriptive design produced several recurring thematic patterns related to the implementation of green fintech within halal-oriented food delivery applications. The reviewed documents consistently described green fintech as a tool that supports transparency, enhances sustainability indicators, and strengthens digital accountability within halal ecosystems.

Results Based on Participants

Analysis of the selected document sources revealed repeated references to eco-friendly payment mechanisms, carbon footprint indicators, and transparent halal supply-chain features. Across the documents, these elements were identified as the most frequently discussed components of green fintech in the context of digital halal services.

Results Based on Research Procedures

Following the steps described in the research procedures, the document review process produced three primary clusters of findings:

1. Environmental sustainability features integrated into food delivery platforms,
2. Halal assurance enhancements through transparency and traceability, and
3. Ethical digital consumer engagement supported by green fintech features.

These clusters represent grouped data derived from coding repeated patterns across the literature.

Results Based on Data Collection Techniques

The literature search across multiple academic databases resulted in a consistent set of publications emphasizing digital sustainability and halal assurance. The keywords most frequently appearing across sources included sustainability, traceability, halal certification, digital transparency, and green fintech. This consistency across sources confirms the thematic relevance identified during the data collection stage.

Results Based on Data Analysis Technique

The qualitative content analysis generated several dominant codes, including:

1. Carbon footprint tracking,
2. Transparent halal supply-chain documentation,
3. Consumer trust enhancement, and

4. Sustainable platform operations.

Table 1 Thematic Coding Categories Identified Through Qualitative Analysis

Code	Meaning	Example in Feature/Application
CFP	Carbon Footprint Practices	Carbon emission tracking features; carbon footprint information shown in delivery apps (e.g., "Green Mode" in GrabFood – illustrative).
EFP	Eco-Friendly Payments	Cashless transactions (GoPay, OVO, GrabPay); green payment options with carbon offset choices.
HST	Halal Supply Transparency	Clear information on halal process; halal labels shown on GoFood/GrabFood restaurant menus.
CTE	Consumer Trust Elements	Verified halal badges, transparency tools, user reviews related to halal assurance.
SDP	Sustainable Digital Practices	"No plastic cutlery" option; bicycle/electric delivery modes.
ECE	Ethical Consumer Engagement	Filters such as "Halal" and "Eco-Friendly"; reminders promoting ethical and sustainable choices.

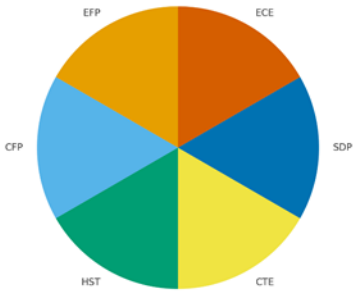

Figure 1 Thematic Distribution of Green Fintech Codes

Discussion

The findings of this study generally support the primary hypothesis that the integration of green fintech features such as ecofriendly payment systems, carbon footprint tracking, and transparent halal supply chain information (Ismawati et al., 2022) can contribute significantly to transforming the halal ecosystem within online food delivery applications. Although the study did not involve direct empirical experimentation, the thematic patterns derived from qualitative content analysis consistently indicate that these features enhance transparency, strengthen consumer trust, and encourage more sustainable and ethical digital consumption (Renaldo et al., 2023). These results align with previous literature suggesting that financial technology can promote efficiency, traceability, and environmentally responsible behavior in digital marketplaces.

The results also support the secondary hypothesis that green fintech reinforces halal tayyib principles by providing more accurate, traceable, and accountable information within the food delivery supply chain. Earlier studies primarily emphasized halal certification systems, consumer perceptions (Ashta, 2023), or usability factors, the present analysis extends existing knowledge by demonstrating that sustainability-oriented financial features can enhance not only operational transparency but also spiritual and ethical dimensions central to the halal ecosystem.

Comparison with prior research, the findings show strong consistency with studies emphasizing the importance of traceability, digital transparency, and sustainability indicators (Puschmann et al., 2020). The present study diverges from earlier works by highlighting the specific mechanisms through which green fintech enables these outcomes in food delivery platforms. Example, while carbon footprint tracking has been widely discussed in sustainability literature, its integration into halal-oriented platforms introduces a novel pathway that connects environmental ethics with Islamic consumption values. This expansion of scope helps contextualize the growing relevance of green fintech in modern halal digital ecosystems.

Several potential sources of bias must be acknowledged. Because the study relies on secondary data rather than primary empirical measurement, the precision of the results is constrained by the strength and limitations of previously published sources. Differences in terminology, inconsistent definitions of green fintech features, and variation across contexts may also influence the thematic patterns identified (Allahhama et al., 2024). The overlap among thematic categories such as transparency, consumer trust, and sustainability may reduce the distinctiveness of some findings, although the clustering process attempted to minimize this overlap.

The study's reliance on a literature-based sample rather than real-world user data also limits its internal validity. The absence of direct intervention or applied testing prevents the measurement of effect sizes or causal pathways. Eco-friendly payment systems are inferred to improve sustainability and consumer awareness, their actual behavioral impact may vary depending on user incentives, app interface design, cultural context, and socio-economic factors (Nugroho et al., 2025). Future empirical studies involving controlled interventions could therefore yield more precise insights into how these mechanisms function in practice.

The majority of the literature focuses on Southeast Asian Muslim-majority countries, particularly Indonesia and Malaysia. Highly relevant for halal studies, the generalizability of findings to non-Muslim markets, minority Muslim countries, or regions with different digital infrastructure may be limited (Musari & Shiddiq, 2022). The sustainability features highlighted in this study such as carbon tracking or eco-friendly delivery modes may not be feasible or relevant in all technological or economic environments.

Limitations also arise from measurement issues in the analyzed sources. Some publications do not provide consistent metrics for evaluating carbon reductions, traceability effectiveness, or improvement in consumer trust (Rachman & Sangare, 2023). Others rely on theoretical propositions without empirical verification. Future research should address these gaps by developing standardized indicators for evaluating green fintech performance in halal ecosystems, conducting cross-platform comparisons, and exploring user-behavior models to determine how green fintech influences decision-making.

Another important consideration involves implementation fidelity. The conceptual integration of green fintech appears promising, actual application in food delivery platforms may encounter technical, economic, or regulatory barriers (Krisna & Yusuf, 2023). Example, carbon-footprint algorithms require accurate environmental data, while halal-supply transparency depends on cooperation from vendors, certifying bodies, and logistics partners. Differences between planned and implemented features may therefore reduce intended outcomes. Research into barriers and enabling factors for effective implementation is necessary to ensure that green fintech can operate as envisioned.

Despite these limitations, the study provides important theoretical and practical insights. Theoretically, it demonstrates that green fintech can serve as a bridge between sustainability ethics and Islamic consumption values, expanding the conceptual boundaries of both fields (Abd Razak et al., 2020). The findings suggest that online food delivery platforms could enhance their competitiveness and consumer trust by integrating features that align with both environmental and halal standards. This has implications not only for businesses but also for policymakers, regulators, and halal certification authorities seeking to modernize and digitize halal assurance systems.

The study highlights the transformative potential of green fintech in reshaping the halal ecosystem toward more transparent, sustainable, and ethical digital practices. The results reinforce the importance of addressing environmental concerns alongside traditional halal requirements, consistent with holistic interpretations of halalan tayyiban. By exploring theoretical connections, identifying thematic patterns, and acknowledging limitations, this study contributes to the growing discourse on sustainable digital innovation within halal industries. Future research should incorporate empirical testing, user-based evaluations, and cross-regional analyses to strengthen the evidence base and further refine strategies for integrating green fintech into halal-focused food delivery applications.

Conclusion

This study set out to examine how the implementation of green fintech features such as eco-friendly payment systems, carbon footprint tracking, and transparent halal supply-chain information can transform the halal ecosystem within online food delivery applications. The findings reaffirm the importance of the thesis that sustainability-oriented financial technologies have the potential to strengthen halal assurance, enhance transparency, and promote ethical digital practices consistent with halalan tayyiban principles. Integrating digital sustainability features into halal focused platforms, green fintech offers a meaningful pathway to address the growing consumer demand for accountable, ethical, and environmentally responsible food delivery services.

The results provide direct support for the primary hypothesis that green fintech can enhance transparency, efficiency, and consumer trust in halal-oriented digital ecosystems. The secondary hypothesis is also supported, as the analysis demonstrates that sustainability features do not merely complement halal requirements but actively reinforce them by providing clearer traceability, more reliable information flow, and more accountable supply chain indicators. These outcomes align with previous research highlighting the importance of digital transparency and traceability, while extending earlier studies by showing how environmental responsibility can be integrated into the halal value framework. Some discrepancies with prior literature stem from differences in terminology and the limited empirical evidence available on green fintech in halal contexts; however, these differences highlight the emerging nature of the field rather than contradictions in theoretical foundations.

The implications of these findings are significant for both theory and practice. The study contributes to expanding the conceptual relationship between Islamic consumption ethics and sustainable digital innovation, positioning green fintech as a bridging framework that unifies environmental stewardship with halal assurance. The study suggests that food-delivery platforms can enhance competitiveness, stakeholder trust, and user engagement by adopting sustainability features aligned with religious and ethical expectations. Policymakers and halal-

certification authorities may also leverage these insights to develop updated, technology-enabled standards for halal supply-chain transparency.

This study, is limited by its reliance on secondary data and qualitative content analysis, which restricts the ability to measure causal effects or quantify actual behavioral change among users. The scope of the literature is also concentrated in Southeast Asian contexts, which may affect the generalizability of the findings to regions with different cultural, economic, or technological conditions. Future research should therefore incorporate empirical studies such as user-behavior experiments, platform-level implementation assessments, and cross-regional comparisons to validate the mechanisms proposed here. Refined measurement tools for assessing sustainability impact, halal transparency indicators, and consumer responses would strengthen the evidence base for green fintech adoption in halal industries.

The integration of green fintech into halal-focused food delivery applications presents a promising avenue for advancing both sustainability and Islamic ethical values within the digital economy. The alignment of environmental responsibility with halal assurance represents not only an innovation in technological design but also a meaningful contribution to the development of a more ethical, transparent, and sustainable halal ecosystem.

References

Abd Razak, M. A., Ramli, M. A., & Jamaludin, M. A. (2020). The Potential Of Food Terrorism Towards Halal Ecosystem. *Food Research*, *4*, 1–11.

Adiansyah, D., Putra, I., & Yusmaniarti. (2025). Sinergi Antara Fintech , Green Accounting , Dan Ekonomi. *Journal Of Islamic Economics And Finance*, *2*(1), 113–122.

Allahhama, M., Sharabatib, A.-A. A., Laiali Almazaydehc, D., Latonye, Q. M. S.-, Frangiehf, R. H., Al-Anatig, G. M., & Adepartment. (2024). The Impact Of Fintech-Based Eco-Friendly Incentives In Improving Sustainable Environmental Performance: A Mediating-Moderating Model. *International Journal Of Data And Network Science*, *8*, 415–430. Https://Doi.Org/10.5267/J.Ijdns.2023.9.013

Ashta, A. (2023). How Can Fintech Companies Get Involved In The Environment ? *Sustainability Article*, *15*.

Ismawati, Trimulyono, Muhlis, & Musdalifah. (2022). The Role Sharia Fintech To Support Halal Industry In Indonesia. *Al-Masraf (Jurnal Lembaga Keuangan Dan Perbankan)*, *2*.

Krisna, R., & Yusuf, M. (2023). Halal Ecosystem Improvement Study Reviewed Of Halal Product Regulations Halal. *International Journal Of Research And Review*, *10*(February), 339–353.

Musari, K., & Shiddiq, K. H. A. (2022). Asean Towards A Global Halal Logistics Through The Digitally Enabled Community. *International Journal Of Asian Business And Information Management*, *13*(2), 1–15. Https://Doi.Org/10.4018/Ijabim.20220701.Oa1

Niu, H., Hung, F. S., Lee, P., & Ni, Y. (2023). Eco-Friendly Transactions : Exploring Mobile Payment Adoption As A Sustainable Consumer Choice In Taiwan And The Philippines. *Sustainability Article*, *15*.

Nugroho, A. P., Fauzan, N., Setiawan, A. D. B., & Pratiwi, A. (2025). Digital Experience And

Reuse Intention In Online Food Delivery Platforms. *Journal Of Digital Marketing And Halal Industry*, *4810*, 1–22.

Puschmann, T., Hoffmann, C. H., & Khmarskyi, V. (2020). How Green Fintech Can Alleviate The Impact Of Climate Change — The Case Of Switzerland. *Sustainability*, *12*.

Rachman, A., & Sangare, B. (2023). Synergy And Collaboration Between Government And Private Institutions In Building Halal Ecosystems In Indonesia. *Jurnal Ilmiah Islam Futura*, *23*(2), 303–326.

Renaldo, N., Sevendy, T., & Wahid, N. (2023). Customer Satisfaction With Online Food Delivery Services Suhardjoa*,. *Luxury: Landscape Of Business Administration Customer*, *1*(2019), 90–101.