

Halal MSME Digitalization: Information Technology-Enabled Business Model Adaptation in the Riau Islands

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Artikel Info

Received:	Revised:	Accepted:	Published:
June 20, 2026	July 27, 2026	September 18, 2026	October 20, 2026

Abstract: This study analyzes the innovation strategies of Smartphone Cellular, an MSME in Batam, in adapting its business model through information technology. Using a descriptive exploratory qualitative approach, the study identified five key innovations: COD delivery services, COD transaction documentation as marketing content, multi-currency payments (IDR, SGD, and MYR), cross-island and cross-border distribution partnerships, and live streaming. These innovations form the SIJORI Adaptive Smartphone MSME Business Model (Hybrid-Trust Model), which integrates Online-to-Offline (O2O), social commerce, and trust-based services. Information technology improves operational efficiency, expands market reach, and strengthens MSME competitiveness. However, the business faces challenges related to exchange-rate fluctuations, logistics complexity, limited digital competencies, and FTZ implementation, which may increase the cost and complexity of distributing goods to areas outside the FTZ. The findings indicate that integrating technology, trust, logistics

Abstrak: Penelitian ini menganalisis strategi inovasi UMKM *Smartphone Cellular* di Batam dalam mengadaptasi model bisnis melalui teknologi informasi. Dengan pendekatan kualitatif deskriptif eksploratif, penelitian menemukan lima inovasi utama, yaitu layanan COD, dokumentasi COD sebagai konten pemasaran, pembayaran multi-mata uang (IDR, SGD, MYR), kemitraan distribusi lintas pulau dan negara, serta *live streaming*. Inovasi tersebut membentuk Model Bisnis UMKM *Smartphone Adaptif SIJORI (Hybrid-Trust Model)* yang memadukan strategi O2O, *social commerce*, dan layanan berbasis kepercayaan. Teknologi informasi meningkatkan efisiensi, memperluas pemasaran, dan memperkuat daya saing UMKM. Namun, UMKM menghadapi kendala fluktuasi nilai tukar, kompleksitas logistik, keterbatasan kompetensi digital, serta penerapan FTZ yang dapat meningkatkan biaya dan kompleksitas distribusi barang ke daerah di luar kawasan FTZ. Temuan ini menunjukkan bahwa integrasi teknologi, kepercayaan,

flexibility, and geographical proximity provides an adaptive strategy for MSMEs in the SIJORI region.

Keywords: MSMEs; Information Technology; Business Model Innovation; SIJORI; Hybrid-Trust Model; FTZ.

fleksibilitas logistik, dan kedekatan geografis menjadi strategi adaptif UMKM di kawasan SIJORI.

Kata kunci: UMKM; Teknologi Informasi; Inovasi Model Bisnis; SIJORI; *Hybrid-Trust Model*; FTZ.

A. Introduction

The rapid advancement of information and communication technology (ICT) has fundamentally transformed patterns of economic activity, particularly in the management, operation, and development of Micro, Small, and Medium Enterprises (MSMEs). The increasing adoption of digital technologies has facilitated the emergence of innovative business models that are more adaptive, efficient, and increasingly oriented toward global markets. In this context, information technology is no longer regarded merely as an operational support tool but has evolved into a strategic resource for generating added value, expanding market access, enhancing operational efficiency, and strengthening the competitiveness and sustainability of MSMEs within the rapidly evolving digital economy.

MSMEs constitute a strategically important pillar of the national economy, given their substantial contribution to economic output and employment generation. According to data from Statistics Indonesia (Badan Pusat Statistik/BPS), MSMEs contribute approximately 60–61% of Indonesia's national Gross Domestic Product (GDP) and account for approximately 97% of total employment (BPS, 2024). These figures highlight the pivotal role of MSMEs in supporting economic growth, employment creation, and socioeconomic development. At the local level, this role is particularly relevant in Tanjungpinang, where MSMEs represent an important component of the local economic structure and serve as a key driver of regional economic activity. Consequently, strengthening the capacity of MSMEs to adopt and

effectively utilize digital technologies is increasingly essential to enhancing their competitiveness and resilience in the context of ongoing economic digitalization.

Despite their significant contribution to the economy, many MSMEs continue to face a range of structural challenges, including limited access to capital and markets, inadequate managerial capabilities, limited innovation in business models, and low operational efficiency. These conditions may constrain business sustainability and growth, particularly amid the accelerating pace of digital transformation and intensifying market competition. The geographically dispersed nature of the Riau Islands presents additional challenges, particularly in terms of high logistics costs, limited distribution access, and considerable interregional distances. Nevertheless, these geographical constraints also create opportunities for the strategic utilization of information technology through digital platforms, such as e-commerce, social media, digital payment systems, and business management applications. These technologies enable MSMEs to overcome geographical barriers, enhance market accessibility, and expand their customer base beyond local boundaries.

The adoption of information technology has also facilitated the transformation of MSME business models, ranging from the transition from conventional marketing practices to digital marketing, from cash-based transactions to cashless payment systems, and from traditional business administration to information system-based management. These transformations have implications for how MSMEs create value, deliver products or services, and capture economic returns, thereby contributing to greater operational efficiency, broader market reach, and stronger customer relationships. The business model perspective emphasizes that a business model provides a framework for understanding a firm's operational strategy, revenue architecture, key resources, and cost structure. In the digital economy, these components are increasingly shaped by the integration of internet-based platforms, artificial intelligence, and big data technologies (Tarumingkeng, 2024). However, the level of technology adoption among MSMEs in the Riau Islands remains relatively low, largely

due to limitations in digital literacy, human resources, technological infrastructure, and understanding of business model innovation strategies (Buci Morisson & Saiful Fikri, 2025).

Several previous studies have examined the issue of MSME digitalization in the Riau Islands from different perspectives; however, each study leaves distinct research gaps. Sheila et al. (2025) investigated the role of digital platforms in shaping the marketing and sales strategies of five culinary MSMEs in the Tepi Laut area of Tanjungpinang using a qualitative approach. The study found that the utilization of social media and QRIS-based digital payment systems had not yet been optimized. However, its analysis was primarily concerned with day-to-day operational marketing practices and did not address the broader transformation of MSME business models. Meanwhile, Putri et al. (2024) examined the role of digital diplomacy in promoting the Go Global Go Digital program for MSMEs in the Riau Islands through a descriptive qualitative approach based on a literature review, with particular emphasis on policy frameworks and cross-border cooperation, including Cross-Border Payment Connectivity. While the study provides a macro-level perspective on the direction of digitalization policies, it does not explore how individual MSME actors adopt and implement information technology-driven business model innovation. In addition, Humaira et al. (2024) focused on enhancing the digital competencies of MSME actors in Batam through seminars and workshops. Although the study reported improvements in participants' understanding, its scope was primarily evaluative of an empowerment program rather than a conceptual and systematic analysis of MSME business model innovation strategies.

The mapping of these previous studies indicates that research on MSME digitalization in the Riau Islands remains relatively fragmented, with existing studies predominantly focusing on digital marketing practices, economic diplomacy and policy, or competency development through training programs. In contrast, studies that specifically examine MSME business model innovation strategies as an integrated

framework encompassing value creation, value delivery, and value capture through the utilization of information technology remain limited, particularly within the context of MSMEs in the Riau Islands. This research gap highlights the need for a more comprehensive examination that connects the business model perspective with the strategic role of information technology. Such an approach moves beyond viewing technology merely as a marketing instrument and instead conceptualizes it as a strategic enabler of sustainable MSME business model transformation. Accordingly, a comprehensive analysis of how information technology facilitates changes in value creation, value delivery, and value capture is essential for understanding the mechanisms through which MSMEs can strengthen their competitiveness and sustainability in the digital economy.

To identify the novelty of the present study, the researchers conducted a systematic mapping of previously published journal articles. Relevant publications indexed in Scopus and published between 2021 and 2026 were retrieved using the Publish or Perish software. The identified publications were subsequently analyzed and mapped using VOSviewer to visualize the research landscape, thematic relationships, and emerging research trends within the field. The results of the bibliometric mapping are presented as follows:

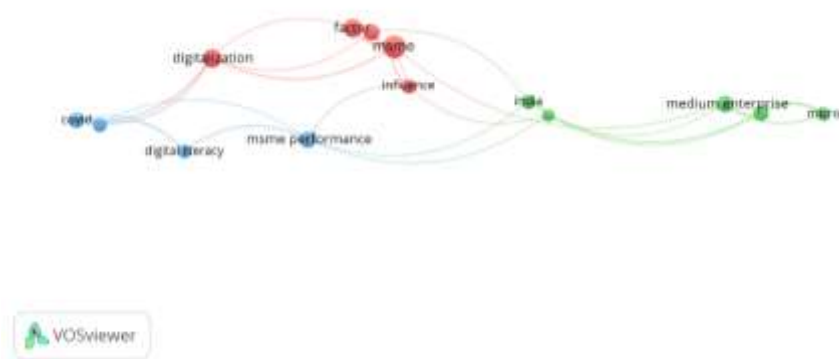


Figure 1. VOSviewer Network Visualization of Scopus-Indexed Publications (2021–2026)

Based on the VOSviewer bibliometric map, research on MSME digitalization remains predominantly concentrated around several major themes, including digitalization, digital literacy, MSME performance, factors, influence, and MSME characteristics, particularly in relation to micro and medium-sized enterprises. The blue cluster illustrates the relationship between digital literacy and MSME performance, particularly in the context of disruptive changes such as the COVID-19 pandemic. Meanwhile, the red cluster focuses more extensively on digitalization as a factor influencing MSMEs, whereas the green cluster reflects research attention toward MSMEs based on business scale and national context, with a particular emphasis on India. These findings indicate that previous studies have extensively examined digitalization as a determinant of improved MSME performance. However, relatively limited attention has been devoted to understanding how digitalization actually facilitates changes in, or adaptation of, MSME business models.

The research gap becomes more evident from the limited prominence of the concept of halal MSMEs within the identified research network. Halal MSMEs possess distinctive characteristics that extend beyond technology adoption and performance enhancement, encompassing the need to maintain compliant business processes, ensure product information transparency, fulfill halal certification requirements, strengthen consumer relationships, and establish trust within the broader halal ecosystem. Therefore, there remains substantial research space for integrating digitalization, information technology, and business model adaptation within the context of halal MSMEs. Furthermore, the predominance of research conducted in general MSME contexts and countries such as India indicates a contextual gap concerning the examination of these phenomena among halal MSMEs in Indonesia, particularly in the Riau Islands, which occupy a strategic position within regional trade and economic activities.

Building upon these identified gaps, the study entitled “*Halal MSME Digitalization: Information Technology-Enabled Business Model Adaptation in the Riau Islands*” seeks to address this underexplored area by moving beyond the conventional question of whether technology improves MSME performance and instead examining how the utilization of information technology enables halal MSMEs to adapt their business models. The study is expected to provide a more integrative perspective on halal MSME digitalization by connecting technology utilization with changes in how MSMEs create value, conduct business activities, interact with customers, and sustain competitiveness within the halal ecosystem. Accordingly, the novelty of this study lies in integrating digitalization with technology-enabled business model adaptation within the context of halal MSMEs in the Riau Islands, an intersection that has not yet emerged as a prominent theme in the existing VOSviewer research landscape.

B. Research Method

This study employed a qualitative approach using a descriptive-exploratory research design to investigate in depth the innovative business model strategies of digital MSMEs through the utilization of information technology in the Riau Islands. This approach was selected because the study was intended not only to describe the existing conditions but also to explore opportunities for developing digital-based business model innovations that are appropriate to the characteristics of MSMEs in an archipelagic region. The study was conducted at *Smartphone Cellular*, an MSME located in East Mall, Batam City. This MSME was selected because it has actively implemented digital-based operations in various aspects of its business activities, including marketing, transaction recording, and internal management.

The research subjects consisted of the business owner, managers, and administrative staff of the MSME who had adopted digital technologies in managing their business operations. Meanwhile, the object of the study was the innovative strategy of information technology-based MSME business models. The data consisted of

primary and secondary data. Primary data were obtained through in-depth interviews, direct observation, and documentation of operational activities, while secondary data were collected from scientific journals, previous research reports, and government policy documents related to the digitalization of MSMEs.

Data collection was conducted using three main techniques. First, semi-structured interviews were conducted with the MSME owner, managers, and staff to explore their level of understanding, implementation practices, challenges, and adaptation strategies related to digital business models in their daily operations. Second, participatory observation was conducted on the MSME's operational activities, including the use of digital applications, transaction recording processes, and online marketing strategies. Third, documentation was collected in the form of digital archives, transaction reports, system screenshots, and promotional and digital marketing materials. These documents served as supporting evidence for verifying the data obtained through interviews and observations.

The collected data were analyzed qualitatively through three stages: data reduction, data presentation, and conclusion drawing and verification. Data reduction involved filtering and classifying relevant information. Data presentation was carried out in the form of narratives, tables, and flow diagrams illustrating the implementation of digital technologies. The final stage involved drawing and verifying conclusions to interpret patterns emerging from the data and assess the effectiveness of digital business model innovation strategies among MSMEs. The findings were subsequently analyzed using a business model element framework comprising the value proposition, customer segments, marketing and distribution channels, key activities, and key partnerships.

C. Results and Discussion

The findings indicate that *Smartphone Cellular* has integrated five forms of innovation: a door-to-door service through Cash on Delivery (COD), the use of COD transaction documentation as marketing content, a multi-currency payment system (IDR, SGD, and MYR), distribution partnerships through inter-island and international

ferry routes, and live streaming as a medium for real-time promotion and sales. When analyzed through the business model elements of value proposition, customer segmentation, marketing channels, key activities, and key partnerships, these five findings form a business model conceptualized as the Adaptive SIJORI MSME Business Model (*Hybrid-Trust Model*).

The model combines Online-to-Offline (O2O) strategies, social commerce, and trust-based services tailored to the geographical and economic characteristics of the SIJORI region (Singapore–Johor–Riau). The model is articulated through three main strategies: (1) market penetration based on the geographical proximity of the SIJORI region; (2) an aggressive logistics service strategy that transforms distribution activities and shipping costs into components of value creation and potential revenue generation; and (3) a *currency inclusivity* strategy through the implementation of a multi-currency payment system that facilitates transactions with consumers across different regions.

However, the study also identifies the characteristics of the *Free Trade Zone* (FTZ) in the Riau Islands as one of the challenges affecting the distribution flexibility of MSMEs. The FTZ status, which provides specific trade and taxation arrangements within designated areas, may result in different treatment when goods are shipped from FTZ areas to other regions of Indonesia. In practice, shipments through courier and logistics services to several areas outside the FTZ may be subject to customs procedures, taxes, and other relatively high charges. Such conditions have the potential to increase selling prices, prolong the distribution process, and reduce the competitiveness of MSMEs when serving customers outside the Riau Islands.

This constraint is particularly significant for *Smartphone Cellular* because its products consist primarily of relatively high-value electronic devices. Consequently, additional taxation, customs duties, and logistics costs may have a substantial impact on the final prices of its products. Accordingly, distribution innovations through ferry routes, COD services, and local partnership networks are not merely marketing strategies but also adaptive strategies for addressing geographical, logistical, and

regulatory barriers arising within the FTZ context. *Smartphone Cellular* seeks to reduce its dependence on conventional parcel delivery by leveraging geographical proximity between islands and neighboring countries, as well as partnership-based distribution networks.

These findings demonstrate that the FTZ presents both opportunities and challenges for MSMEs. On the one hand, the FTZ can provide opportunities for trade and broader market access, particularly due to the strategic geographical position of the Riau Islands and their proximity to Singapore and Malaysia. On the other hand, differences in trade regimes between FTZ areas and other customs territories can become a barrier when MSMEs distribute goods to consumers outside the designated FTZ. Therefore, the ability of MSMEs to develop alternative distribution channels, utilize local logistics networks, and integrate digital technologies with trust-based relationships is crucial for maintaining competitiveness.

Thus, the *Hybrid-Trust Model* not only represents *Smartphone Cellular's* digital innovation but also reflects the MSME's capacity to adapt to the structural conditions of the SIJORI region, including distribution barriers associated with FTZ implementation. This business model positions geographical proximity, logistics flexibility, digital technology, customer trust, and payment inclusivity as an integrated strategic framework for overcoming distribution constraints while simultaneously creating new market opportunities for MSMEs operating in border regions.

D. Conclusion

Based on the findings regarding the innovative business model strategies of *Smartphone Cellular* MSME through the utilization of information technology in the Riau Islands, it can be concluded that *Smartphone Cellular* has developed an adaptive business model that integrates information technology, geographical proximity, distribution flexibility, and trust-based services. This integration is conceptualized as the Adaptive SIJORI Smartphone MSME Business Model (*Hybrid-Trust Model*), which

combines Online-to-Offline (O2O) strategies, social commerce, and trust-based services in response to the characteristics of markets in border and archipelagic regions.

The *Hybrid-Trust Model* is manifested through five major forms of innovation: (1) door-to-door services through COD, (2) the use of COD transaction documentation as marketing content, (3) a multi-currency payment system involving IDR, SGD, and MYR, (4) distribution partnerships through inter-island and international maritime routes, and (5) the utilization of live streaming as a medium for real-time promotion and sales. These five innovations demonstrate that information technology is not merely utilized as a promotional tool but has become an integral component of value creation, customer interaction, transactions, distribution, and market development.

The utilization of information technology plays an important role in improving operational efficiency, expanding marketing reach, accelerating interactions with consumers, and strengthening the competitiveness of *Smartphone Cellular* MSME. Digital strategies combined with direct services and personalized approaches enable the MSME to establish customer trust, which constitutes a competitive advantage over conventional retail transaction patterns and competition with large-scale modern retailers. Thus, digital transformation among MSMEs is not solely concerned with technology adoption but also with the ability to integrate technology with interpersonal relationships to create a more flexible and trustworthy customer experience.

The implementation of this business model also generates positive impacts on business performance and sustainability, as reflected in the expansion of market share, increased transaction volume, the ability to reach consumers across regions, and strengthened customer loyalty. Batam's strategic geographical position within the SIJORI region constitutes one of the key supporting factors, as it provides access to the domestic market while simultaneously creating opportunities for economic interaction with Singapore and Malaysia. The availability of maritime transportation and partnership networks also enables the MSME to develop more flexible distribution patterns that are aligned with the characteristics of archipelagic and border regions.

Nevertheless, the study found that the implementation of this business model is not without structural and operational challenges. The implementation of the *Free Trade Zone* (FTZ) is an important aspect that needs to be considered in MSME distribution activities, particularly when goods are shipped from FTZ areas to other regions of Indonesia. Differences in trade and customs treatment between FTZ areas and other customs territories can make the distribution process more complex and potentially generate additional taxes, duties, and logistics costs. For MSMEs trading relatively high-value smartphone devices, these additional costs may increase final product prices and affect competitiveness when serving consumers outside the FTZ.

This condition demonstrates that the FTZ has a *dual effect* on MSMEs. On the one hand, FTZ status and Batam's strategic location provide opportunities for international trade and broader market access within the SIJORI region. On the other hand, when MSMEs distribute goods to areas outside the FTZ, customs procedures, taxation, and logistics costs may become constraints that reduce distribution flexibility. Therefore, COD services, the utilization of maritime transportation routes, the establishment of distribution partnerships, and direct customer engagement can be understood as forms of MSME adaptation strategies to geographical, logistical, and FTZ-related regulatory conditions, rather than merely as marketing strategies.

Overall, this study demonstrates that the competitiveness of MSMEs in archipelagic and border regions is determined not solely by the level of technology adoption but also by their ability to integrate technology, trust, geographical proximity, distribution networks, and adaptability to the regulatory environment. The *Hybrid-Trust Model* represents an approach through which MSME digitalization can be developed using a hybrid strategy that combines digital channels with direct interactions, flexible payment systems, and partnership-based distribution networks. The model further demonstrates that geographical and regulatory constraints can be transformed into opportunities for innovation when MSMEs are able to design business models that

correspond to the characteristics of their operating environment and the needs of their customers.

Future research is encouraged to test and refine the Adaptive SIJORI Smartphone MSME Business Model (*Hybrid-Trust Model*) across various types of MSMEs operating in archipelagic regions, border areas, and other FTZs in Indonesia. Such testing could employ quantitative, mixed-methods, or comparative approaches to assess the model's generalizability and identify the factors that most strongly determine the success of its implementation. Furthermore, future studies could extend the model by incorporating emerging technologies such as Artificial Intelligence (AI), customer analytics, cross-border digital payment systems, blockchain, and digital logistics technologies. Future research should also examine more comprehensively the effects of FTZ policies, taxation, customs regulations, and logistics costs on MSME competitiveness. Such studies could provide evidence-based policy recommendations for developing a more efficient trade ecosystem and supporting sustainable MSME growth in Indonesia's border regions.

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