From Readiness to Adoption: Blockchain and Targeted Marketing for Fine Payments in Telecommunications

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Abstract. The telecom sector recognizes blockchain technology as an effective solution for improving administrative penalty payment systems, enhancing transparency and efficiency, and deterring fraud through secure, decentralized, and accountable digital transaction processes. However, adoption levels differ across sectors due to varying technological readiness, unclear regulations, and insufficient marketing strategies. This study presents a systematic literature review (SLR) of 41 peer-reviewed articles from 2021 to 2025, sourced from databases like Scopus, ScienceDirect, Sage, and Emerald. By applying the Diffusion of Innovation Theory alongside Marketing Segmentation Theory, we identify key adoption barriers, such as perceived complexity and institutional resistance. Our findings show that early adopters are motivated by strategic advantages, while laggards often hesitate due to risk aversion. Moving forward, research should focus on improving consumer segmentation in blockchain adoption models within public administration. We propose a framework that merges technological readiness with marketing strategy to enhance blockchain adoption and reduce fraud in digital payment systems for administrative fines.

Keywords: Blockchain, Adoption, Marketing, Fraud, Systematic Literature Review

1 Introduction

The enactment of Law No. 6 of 2023 in Indonesia, particularly in the telecommunications sector, marked a significant policy shift from criminal to administrative sanctions. This change created new challenges for regulators, especially in managing fine payments within the radio frequency spectrum. Traditional payment processes remain manual and prone to inefficiencies, despite contributing substantial state revenue estimated at IDR 26 billion in 2024. A secure and transparent system is therefore urgently needed. Digital transformation offers opportunities to improve public service systems, including fine management. Among various innovations, blockchain stands out for its immutability, transparency, and efficiency. Blockchain increases transparency in the organ supply chain and transplant process [1]. Its

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application in fine payment systems can reduce administrative burdens, strengthen regulatory trust, and minimize fraudulent practices. The application of blockchain has a major impact on the quality of accounting information [2]. Fraud theories such as [3,4], emphasize the interplay of pressure, opportunity, rationalization, and collusion in enabling corruption. In this context, blockchain offers a structural solution by limiting opportunities for manipulation.

However, adoption has been slow. There is a gap between high interest and low blockchain adoption rates in organizations [5]. Barriers include technological complexity, limited organizational readiness, regulatory uncertainties, and the absence of strong marketing strategies that address diverse user needs. Performance expectations and price values have a positive effect, while financial literacy is negatively related to the intention to use [6]. Low literacy, privacy security risks, and high prices are the main barriers to adoption [7].

Previous studies often prioritize technical and security perspectives, overlooking behavioral and market-driven factors in adoption. Early beliefs and social influences are particularly relevant in the intention of using financial technology [3]. To bridge this gap, the Diffusion of Innovation (DoI) theory and market segmentation approaches [8] provide useful lenses to understand adoption dynamics. Integrating these perspectives enables strategies that are not only technically sound but also tailored to user readiness and perceptions. This article aims to synthesize existing literature on blockchain adoption in the telecommunications sector, focusing on readiness, adoption barriers, and targeted marketing strategies.

2. Methods

This study employs a Systematic Literature Review (SLR) to analyze blockchain adoption and marketing strategies in the context of fine payment systems. Following [9], the SLR process involves systematic planning, selection, and synthesis of prior studies to ensure transparency and replicability. Formulating the initial research question in the SLR method was used to guide the search and extraction of the literature. A good research question will be measured to understand the state-of-the-art research on the research topic. The determination of research questions is based on five elements known as PICOC

Table 1. PICOC (Population, Intervention, Comparison, Outcomes, Context) Framework

PICOC Framework	Criterion
Population	Individuals, organizations in the face of new technologies
Intervention	Implementation of blockchain technology
Comparism	Traditional payment systems
Outcomes	Readiness or adoption of new technologies
Context	Studies in industrial, organizational, government, private and public sector implementation

Source: Author's Work

Research questions were formulated using the PICOC framework. Key queries focused on:

1. What factors influence blockchain adoption in organizations and individuals?

2. How can blockchain add value to fine payment systems and fraud prevention?
3. How do segmentation and marketing strategies shape adoption behavior?
4. What strategies most effectively promote blockchain adoption in telecom fine management?

For this study, secondary data from SCOPUS, SAGE, EMERALD, and SCIENCEDIRECT were used in the form of journal articles indexed by Scopus Q1, Q2, and Q3, published between 2021 and 2025. The selection of Scopus-indexed journals ensures that the articles used are of high quality and internationally recognized. This research was conducted on May 5, 2025, using the following keywords: ("blockchain" AND "adoption" AND "readiness" AND "fraud"). The selection process is assisted by using the Publish or Perish 8 application to obtain keywords that meet the criteria the author has set.

This study established the following inclusion criteria: (1) articles that discuss the application of blockchain technology; (2) articles published in Scopus Q1, Q2, and Q3 indexed journals; (3) articles published between 2021 and 2025; (4) articles that can be opened in full; and (5) articles published in English. The exclusion criteria used in this study were (1) articles that were not relevant to the research topic, (2) articles that were not available in full text, (3) articles published outside the 2021-2025 period will be excluded, (4) articles that could not be fully opened, and (5) articles written in languages other than English will be excluded.

For this study, we used the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analysis) flow diagram. The process of selecting articles for research includes the first stage, which involves reading the title and abstract of the article to determine its relevance to the research topic. In the second stage, articles that passed the initial selection were then read in full to ensure suitability with the inclusion criteria, and in the third stage, articles that met the inclusion criteria were further analyzed to identify key findings relevant to this study. To achieve this goal, articles were collected from journals issued by Scopus, Sage, ScienceDirect, and Emerald, a total of 41 articles or journals.

3. Results And Discussion

This study aims to move beyond techno-centric explanations by integrating behavioral and market perspectives. In this study, a systematic literature review was used to answer the research questions that had been set by the researcher. This study provides a grouping of journal review results into four datasets to answer the research question as follows:

Customer value and perceived usability have an effect on the intention to use crypto, with trust as the main mediator [10]. The research data shows that the factors that affect the adoption of blockchain technology in individuals and organizations, key factors shaping adoption include are as follows: Accounting information technology level, information security infrastructure, training, legality, and regulation. Social influence, expectations, technological readiness, interest in technology, technological awareness, perceived trust, and perceived risk. Increased competitive advantage, awareness of online advertising and privacy concerns, and pragmatic benefits. The perceived benefits

are influenced by factors such as complexity, risk, high initial costs, inadequate knowledge, trial capability, peak management support, external pressures, and organizational size.

Findings show blockchain's decentralized, immutable nature significantly reduces opportunities for fraud in fine payments. Blockchain overcomes the challenges of recording and sharing data; suitable for real-time and triple-entry accounting [11]. Smart contracts improve accountability, while transparent records limit information asymmetry and enhance trust between regulators and stakeholders, as follows: Its decentralized and secure transaction capabilities without the need for intermediaries. Increased profitability, value creation through partnerships, smart contract-backed value delivery, and enhanced business value proposition through operational enhancement. Blockchain technology has a significant impact on the quality of accounting information systems. Increased transparency and trust in accounting practices by providing data that cannot be changed, only added, shared, verified, and agreed upon. Blockchain technology can reduce information asymmetry, increase agent control, and minimize principals' trust in agents.

Market segmentation accelerates adoption by tailoring blockchain solutions to different user groups. For instance, high-volume transaction segments are more likely to adopt quickly due to efficiency gains. It is necessary to integrate strategic and entrepreneurial perspectives [12]. Differentiated strategies allow customized solutions, better alignment with regulatory needs, and targeted communication. Companies that lag behind in app services tend to emulate the pioneers, while the pioneers move forward by offering complementary features and novelty [13]. Consumer segmentation studies the differences in consumer characteristics that affect the perceptions of blockchain. Curiosity has a positive effect on the intention to use technology [14]. It is important to understand how different consumer groups respond to marketing strategies. The Potential Impact of Market Segmentation on Blockchain Implementation. Solution Customization: Different market segments within the telecommunications sector require customized blockchain solutions for various transaction volumes and regulatory requirements. Adoption Rate: Market segmentation can affect the adoption rate of the blockchain technology. Segments with higher transaction volumes and greater regulatory oversight can adopt the blockchain faster for implementation. Economic Incentives: The economic incentives for adopting blockchain can vary across segments, which affects the overall implementation strategy. Segments with potential cost savings and higher efficiency improvements are more likely to invest in blockchain technology.

Several marketing strategies can be used to effectively promote the implementation of blockchain in the telecommunications sector for payment of administrative fines. AI adoption factors vary based on firm size; Large firms focus on operational efficiency while small firms focus on market differentiation. Large firms face broader regulatory hurdles [15]. Blockchain adoption is not merely a technological issue but a marketing challenge. Raising awareness, simplifying complexity, and reducing perceived risks through communication and education are essential. Effective promotion requires strategies that emphasize: Focus on transparency and security, Cost reduction and efficiency, Leveraging digital marketing channels, Building trust through

demonstrations and case studies, Regulatory compliance and process, Customer-centered approach, and Feedback from early adopters. The results of the research explain that blockchain technology in its adoption can increase digital marketing, with the following research results: Marketing to increase the adoption of digital technology plays a critical role in value creation and competitive advantage. Curiosity and complexity had the highest performance index among the factors analyzed, suggesting areas for improvement in design and marketing strategies. These findings emphasize the need for digital skills training and development to facilitate the adoption of digital transformation. The study provides meaningful insights for aspiring and existing entrepreneurs, emphasizing the importance of innovative technology solutions to remain relevant in the market. Consequently, the findings imply that the success of blockchain implementation is contingent upon the ability of organizations to orchestrate both technological readiness and market-oriented strategies in a coherent manner. Digital transformation (DT) positively affects innovation and company performance through resource optimization mechanisms, knowledge amplification, and financial risk management [12]. This integrative approach not only enhances adoption effectiveness but also contributes to building institutional trust and supporting more sustainable digital transformation in the public sector.

4. Conclusion

This study reframes blockchain adoption in telecommunications as a socio-technical diffusion process shaped by the interaction between innovation attributes and market-oriented strategies. Moving beyond a techno-centric perspective, the findings demonstrate that the effectiveness of blockchain implementation is not determined solely by its functional advantages, but by how these advantages are perceived, communicated, and aligned with heterogeneous adopter segments. By integrating DoI theory with targeted marketing segmentation, this study develops a mechanism-based explanation of adoption, showing that adoption trajectories are contingent upon the fit between innovation characteristics (e.g., relative advantage, complexity, and uncertainty) and segment-specific cognitive and behavioral responses. This integrated perspective explains why adoption remains uneven despite clear technological benefits, and why differentiated strategies are required to bridge the gap between readiness and actual use.

Theoretically, this study contributes by extending DoI into a more context-sensitive framework that incorporates market segmentation as a strategic mediator of adoption dynamics, thereby addressing the limitation of prior models that treat adopters as relatively homogeneous. This positions adoption not as a linear diffusion process, but as a strategically managed and segmented transformation pathway. From a practical standpoint, the findings suggest that policymakers and organizations should prioritize targeted engagement strategies, where early adopters function as catalysts for legitimacy, while late adopters require structured risk-reduction and trust-building interventions.

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