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Blockchain Based Consumer Protection Against Debt Collector Misconduct in Fintech Industry in Indonesia

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ABSTRACT

This study **examines** the urgency of digital consumer protection against debt collector misconduct in Indonesia's fintech lending industry. The rapid growth of digital financial services has expanded financial inclusion, but it has also created new risks for consumers, including intimidation, threats, psychological pressure, and misuse of personal data during debt collection processes. This **study aims** to analyze the forms of debt collector misconduct, evaluate the effectiveness of existing consumer protection regulations, and propose a blockchain-based protection framework for improving transparency, accountability, and consumer safety. Using a normative juridical approach supported by conceptual analysis, this study reviews consumer protection laws, fintech regulations, and recent literature on blockchain governance, smart contracts, decentralized identity, and digital audit trails. The **findings** show that current regulatory mechanisms remain insufficient to address illegal fintech platforms and unethical debt collection practices because supervision is often fragmented, reactive, and difficult to verify. Therefore, this study proposes the integration of blockchain-based audit trails, smart contract complaint mechanisms, and decentralized identity protection to strengthen evidence recording, prevent data misuse, and improve regulatory accountability. The **study contributes** to the development of digital consumer protection by connecting legal analysis with blockchain applications in fintech governance. It also supports SDGs 8 by promoting safer and more inclusive digital financial services, and SDGs 16 by strengthening justice, accountability, and institutional trust in the digital financial ecosystem.

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1. INTRODUCTION

The development of the digital financial services industry in Indonesia has shown significant growth, particularly through Financial Technology (Fintech) services and online lending platforms [1]. These services have expanded financial access for people who were previously underserved by formal financial institutions. However, the rapid growth of fintech has also created serious consumer protection challenges [2, 3, 4]. One of the most urgent issues is the misconduct of debt collectors, including intimidation, verbal threats, psychological pressure, and violations of consumer privacy. These practices show that digital financial innovation has not been fully supported by effective regulatory enforcement, transparent supervision, and secure consumer protection

mechanisms [5, 6]. Therefore, consumer protection in fintech services requires a stronger governance model that can ensure fairness, accountability, and consumer safety [7].

Although Indonesia has established regulations to govern fintech lending and consumer protection, implementation still faces several challenges [8, 9]. Existing complaint and supervision mechanisms are often centralized, fragmented, and dependent on manual reporting. This condition makes it difficult for regulators to trace debt collection activities, verify consumer complaints, and prevent evidence manipulation [10, 11]. In addition, illegal fintech platforms often operate outside formal supervision, creating greater risks for consumers [12]. Previous studies have mostly discussed fintech consumer protection from legal and regulatory perspectives, while limited attention has been given to technology-based protection models [13, 14]. Therefore, this study highlights the need for blockchain-based consumer protection through transparent audit trails, smart contract-based complaint mechanisms, decentralized identity protection, and blockchain governance to improve accountability in fintech debt collection practices [15, 16].

Blockchain technology can play an important role in strengthening consumer protection in the digital financial services industry [17, 18]. Through a blockchain based audit trail, every debt collection activity can be recorded transparently and cannot be easily changed [19]. This makes it easier for regulators to trace violations and evaluate whether the collection process follows the applicable rules [20]. Smart contracts can also help automate several stages of the complaint process, from reporting and verification to case handling, based on rules that have been set beforehand. In addition, decentralized identity mechanisms can provide better protection for consumers' personal data by limiting unnecessary access by third parties [21, 22]. Therefore, the use of blockchain in this context is not only relevant as a technological innovation, but also as a practical solution to improve transparency, accountability, data protection, and governance in the fintech ecosystem.

This study is also connected to the Sustainable Development Goals (SDGs), particularly SDGs 8 and SDGs 16. Strengthening consumer protection in fintech supports SDGs 8 by promoting inclusive, safe, and sustainable digital economic growth. Consumers who are protected from intimidation and data misuse are more likely to trust digital financial services and participate in the formal economy [23, 24]. At the same time, transparent supervision and accountable complaint mechanisms support SDGs 16 by strengthening justice, institutional trust, and legal protection [25]. Thus, consumer protection in fintech should not only be viewed as a legal issue, but also as part of sustainable digital governance [26].

This study focuses on identifying and analyzing abusive practices by debt collectors in Indonesia's digital financial services industry, evaluating the weaknesses of existing consumer protection mechanisms, and proposing a blockchain-based consumer protection framework [27]. The research questions include:

- What forms of misconduct are commonly carried out by debt collectors in the fintech ecosystem.
- How effective are current regulations in protecting consumers.
- How can blockchain technology support a more transparent, secure, and accountable consumer protection model.

This study is expected to provide theoretical contributions to digital consumer protection studies and practical implications for regulators, fintech companies, and consumer protection agencies in building a safer and more trustworthy digital financial ecosystem.

Furthermore, this study is expected to enrich the existing literature by providing a comprehensive understanding of the factors influencing consumer protection in digital financial services. As digital financial platforms continue to evolve, identifying the challenges and opportunities related to consumer security, privacy, and trust becomes increasingly important for sustainable ecosystem development [28, 29]. This research may also serve as a reference for policymakers in designing adaptive regulations that are responsive to technological advancements [30]. Effective regulatory frameworks can help balance innovation and consumer protection, ensuring that financial technology development does not compromise users' rights and interests.

For fintech companies, the findings of this study can provide valuable insights into improving service quality, strengthening data protection mechanisms, and implementing transparent business practices. Such improvements can enhance consumer confidence and encourage the long-term adoption of digital financial services.

Consumer protection agencies may utilize the results of this study to develop more targeted educational programs and awareness campaigns. Increasing consumers' digital literacy can empower individuals to

identify potential risks, make informed decisions, and protect themselves from digital fraud and cyber threats. This study is expected to contribute to the creation of a collaborative digital financial ecosystem involving governments, businesses, consumer organizations, and users. Strong cooperation among stakeholders is essential to fostering an environment that prioritizes innovation, accountability, and consumer trust while supporting inclusive and sustainable digital economic growth.

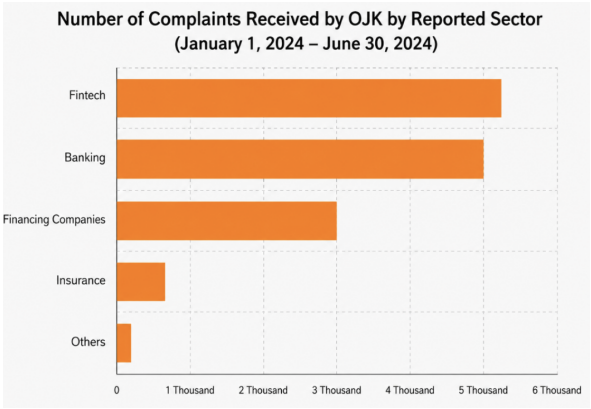


Figure 1. Number of Consumer Complaints in the Financial Services Sector in Indonesia (2025)

Figure 1 shows that the fintech sector is one of the largest contributors to consumer complaints in Indonesia. The high number of complaints indicates that fintech services still face serious consumer protection challenges, particularly in relation to online lending and debt collection practices. This condition strengthens the urgency of developing a more transparent and accountable supervision system to protect consumers from unethical practices.

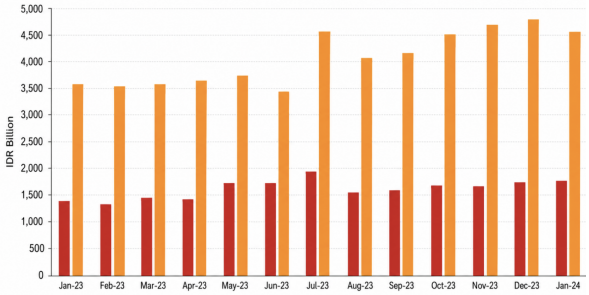


Figure 2. Trends in Illegal Online Loan Complaints and Consumer Risks

Figure 2 illustrates the increasing risks in the online lending industry, particularly those related to illegal entities. Illegal online loan platforms are often associated with aggressive and intimidating debt collection practices, including threats, misuse of personal data, and psychological pressure. These risks highlight the need for stronger regulatory enforcement and technology-based monitoring mechanisms, including blockchain-supported audit trails and complaint verification systems.

2. LITERATURE REVIEW

Consumer protection in the digital financial services industry has become an increasingly important issue due to the rapid growth of financial technology services, particularly online lending platforms [31, 32]. In Indonesia, consumer protection is generally regulated under Law Number 8 of 1999 concerning Consumer Protection, which guarantees consumers' rights to comfort, security, and safety in using goods and services [33]. However, the digitalization of financial services has created new challenges, including data misuse, unfair digital contracts, limited transparency, and unethical debt collection practices. These challenges show that conventional consumer protection mechanisms are no longer sufficient to address risks in the digital fintech ecosystem [34, 35].

Debt collection misconduct in online lending has become one of the most serious consumer protection issues [36]. Debt collectors are expected to ensure repayment obligations, but in practice, several cases involve intimidation, threats, repeated digital harassment, and unauthorized disclosure of personal data [37]. These practices violate ethical and legal principles, particularly those related to privacy, fairness, and consumer dignity. Although regulations issued by the Financial Services Authority provide standards for fintech operations and debt collection behavior, enforcement remains challenging, especially for illegal or unregistered platforms. This condition creates a regulatory gap between formal legal protection and actual consumer experiences in digital financial services [38].

Recent studies have emphasized the need for technology-based governance to strengthen consumer protection in fintech [39]. Blockchain technology offers potential solutions through transparency, immutability, decentralization, and traceability. In the context of debt collection, blockchain can be used to create an immutable audit trail that records collection activities, communication logs, payment status, collector identity, and consumer complaint history [40, 41]. This mechanism can reduce manipulation, improve accountability, and provide verifiable evidence when disputes occur. Furthermore, smart contracts can support automated compliance by ensuring that debt collection procedures follow predefined legal and ethical rules before further collection actions are conducted [42].

Decentralized identity is also relevant for protecting consumers from personal data misuse. Through decentralized identity mechanisms, consumers can control which personal information is shared with fintech providers or debt collection parties [43, 44]. This approach reduces excessive access to sensitive data and helps prevent privacy violations. In addition, blockchain governance can support stronger coordination among regulators, fintech companies, consumer protection agencies, and law enforcement institutions. By using a shared and verifiable digital record, supervision can become more transparent, responsive, and evidence-based.

From a theoretical perspective, this study is grounded in consumer protection theory, justice theory, and information asymmetry theory. Consumer protection theory emphasizes the need to safeguard consumers from harmful business practices, while justice theory highlights the importance of fairness in the relationship between fintech providers and borrowers [45, 46]. Information asymmetry theory explains how consumers are often placed in a weaker position due to limited knowledge about digital financial products, loan risks, and legal rights. Therefore, integrating blockchain into consumer protection is important because it can reduce information gaps, improve transparency, and strengthen trust in digital financial services.

Based on previous studies, most research on fintech consumer protection in Indonesia has focused on legal norms, regulatory enforcement, and consumer literacy. However, limited studies have proposed a blockchain-based protection model to prevent and monitor debt collector misconduct. This creates a research gap that this study aims to address by proposing a digital consumer protection approach supported by blockchain audit trails, smart contract-based complaint mechanisms, decentralized identity, and collaborative governance. This approach is expected to strengthen consumer protection while supporting SDGs 8 on inclusive economic growth and SDGs 16 on justice, accountability, and strong institutions.

3. RESEARCH METHODOLOGY

This study uses a normative juridical and conceptual research approach to analyze consumer protection against debt collector misconduct in Indonesia's digital financial services industry [47]. The normative juridical approach is applied to examine relevant legal instruments, including consumer protection regulations, financial technology regulations, personal data protection rules, and supervisory policies issued by the Financial Services Authority. This approach is used to identify legal gaps, regulatory weaknesses, and enforcement challenges related to abusive debt collection practices in fintech lending services. In addition, the conceptual approach is employed to develop a blockchain-based consumer protection framework as a proposed solution to improve transparency, accountability, and traceability in debt collection activities.

The proposed framework emphasizes the potential role of blockchain technology in strengthening consumer protection within the fintech ecosystem. It includes several key components, namely a blockchain-based audit trail to record debt collection activities, a smart contract-based complaint mechanism to automate complaint verification and escalation, decentralized identity protection to reduce the misuse of consumer personal data, and a regulator monitoring dashboard to support supervisory functions. These components are expected to provide a more transparent and accountable protection model for consumers while also assisting regulators and fintech companies in monitoring debt collection practices more effectively [48, 49].

The data used in this study are secondary data obtained from official reports, legal documents, regulatory publications, academic literature, and consumer complaint data related to fintech lending and debt collection practices. The analysis focuses on several key aspects, including types of debt collector misconduct, consumer impacts, applicable legal provisions, regulatory gaps, and potential blockchain-based solutions.

The collected data are analyzed through legal interpretation, content analysis, and comparative analysis between conventional regulatory mechanisms and technology-based consumer protection models.

The research procedure consists of four main stages. First, the study identifies forms of misconduct in fintech debt collection, such as intimidation, threats, repeated harassment, and misuse of personal data. Second, it maps the existing legal framework and evaluates its effectiveness in protecting consumers. Third, it analyzes regulatory gaps that allow abusive practices to continue, particularly in illegal or weakly supervised fintech platforms. Fourth, it formulates a blockchain-based protection framework that can be used by regulators, fintech companies, and consumer protection agencies to strengthen monitoring, complaint handling, and accountability.

The validity of the proposed framework is assessed through logical consistency and regulatory relevance. The framework is evaluated based on its ability to address major consumer protection problems, such as lack of transparency, weak complaint documentation, limited accountability, and misuse of personal data. Therefore, this methodology provides a structured legal and technological analysis that supports the development of a more transparent, accountable, and consumer-oriented fintech ecosystem.

The blockchain based mechanism is not intended to replace existing legal and supervisory instruments, but to complement them by providing immutable records, verifiable complaint histories, and transparent monitoring of debt collection activities. By combining legal analysis with blockchain-oriented system design, this study offers a more applicable methodological foundation for strengthening consumer protection, supporting regulatory enforcement, and reducing the risk of repeated misconduct in digital financial services.

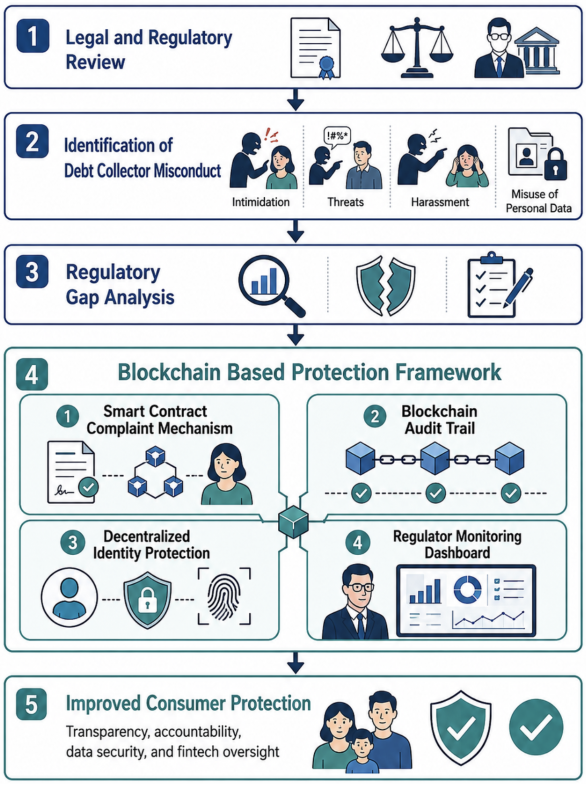


Figure 3. Blockchain Based Consumer Protection Framework for Fintech Debt Collection

Figure 3 illustrates the proposed blockchain-based consumer protection framework. Following legal review, misconduct identification, and regulatory gap analysis, the framework introduces smart contract complaints, blockchain audit trails, decentralized identity protection, and regulator monitoring tools to strengthen transparency, accountability, data security, and consumer protection in fintech debt collection.

4. RESULTS AND DISCUSSION

The findings show that debt collector misconduct in Indonesia's digital financial services industry remains a serious consumer protection issue. The most common forms of misconduct include verbal intimidation, threats, repeated digital harassment, psychological pressure, and the misuse or disclosure of consumers' personal data. These practices are commonly carried out through phone calls, instant messaging platforms, and social media exposure. This condition indicates that consumers are placed in a vulnerable position because of limited financial literacy, weak bargaining power, and insufficient understanding of their legal rights in digital lending transactions.

From a regulatory perspective, Indonesia already has several legal instruments to protect consumers, including Law Number 8 of 1999 concerning Consumer Protection and regulations issued by the Financial Services Authority. However, the implementation of these regulations remains limited, especially in handling illegal fintech platforms and unethical third-party debt collection practices. The persistence of consumer complaints shows a gap between formal legal protection and practical enforcement. This gap demonstrates that conventional regulatory mechanisms are no longer sufficient to address the complexity of misconduct in digital financial services. To strengthen the analysis, this study maps debt collector misconduct, consumer impacts, regulatory gaps, and blockchain-based solutions, as shown in Table 1.

Table 1. Mapping of Debt Collector Misconduct and Blockchain-Based Consumer Protection

Type of Misconduct	**Legal and Regulatory Concern**	**Consumer Impact**	**Regulatory Gap**	**Proposed Blockchain-Based Solution**
Verbal intimidation and threats	Violation of consumer rights to safety, comfort, and fair treatment	Psychological pressure, fear, and loss of trust in fintech services	Weak monitoring of debt collection communication	Blockchain-based audit trail to record collection activities transparently
Repeated digital harassment through calls and messages	Unethical collection practice and potential violation of consumer protection standards	Emotional stress and disturbance of daily activities	Lack of real-time supervision over collection frequency	Smart contract rules to limit collection time, frequency, and approved communication channels
Disclosure of personal data	Violation of privacy and personal data protection principles	Reputation damage, social pressure, and identity risk	Weak control over consumer data access by third parties	Decentralized identity system to reduce direct exposure of sensitive consumer data
Collection by illegal fintech entities	Operation outside formal supervision of the Financial Services Authority	Consumers have limited complaint channels and legal remedies	Difficulty tracing illegal actors and transaction records	Distributed ledger registry for verified fintech platforms and licensed collection agents
Manipulation or denial of collection evidence	Weakens accountability in dispute resolution	Consumers face difficulty proving misconduct	Evidence can be deleted, altered, or denied by collectors	Tamper-resistant blockchain records to support complaint verification and legal enforcement

Table 1 shows that debt collector misconduct is not only a legal issue, but also a governance and data accountability problem. In many cases, consumers face difficulty proving intimidation, threats, or misuse of personal data because the evidence is often scattered across private messages, phone records, or social media interactions. Therefore, a more transparent and verifiable system is needed to support consumer protection and regulatory enforcement.

Figure 4 summarizes how blockchain-based technologies can address these challenges by integrating multiple protection mechanisms that collectively improve transparency, accountability, and consumer trust within the fintech ecosystem.

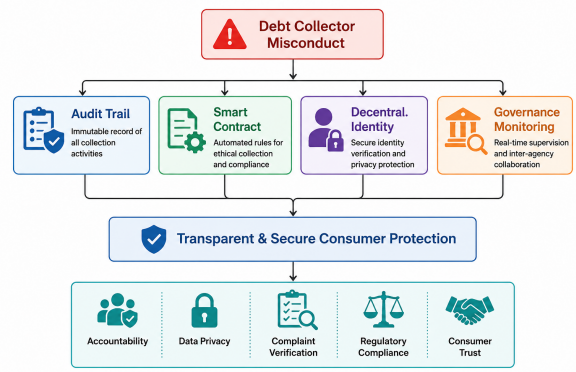


Figure 4. Blockchain-Based Consumer Protection Mechanisms and Expected Outcomes

As illustrated in Figure 4, consumer protection can be strengthened through the integration of four complementary blockchain mechanisms: blockchain-based audit trails, smart contracts, decentralized identity, and governance monitoring. Rather than functioning independently, these mechanisms operate together to create a transparent, secure, and accountable consumer protection framework. Blockchain audit trails provide immutable records of debt collection activities, smart contracts automate compliance with predefined collection rules, decentralized identity safeguards consumers' personal information, and governance monitoring enables regulators to supervise fintech activities more effectively. Collectively, these mechanisms contribute to improved accountability, stronger data privacy, more reliable complaint verification, enhanced regulatory compliance, and greater consumer trust.

Blockchain technology can be used as a supporting mechanism to create a transparent and tamper-resistant audit trail for debt collection activities [50]. Every collection interaction, warning notification, payment reminder, and consumer complaint can be recorded in a distributed ledger. This mechanism allows regulators, fintech companies, and consumer protection agencies to verify whether debt collection procedures comply with ethical and legal standards. Through blockchain-based records, the possibility of evidence manipulation, deletion, or denial by irresponsible parties can be reduced. In addition, smart contracts can support automated compliance in debt collection procedures. A smart contract-based mechanism may limit debt collection activities to approved timeframes, restrict repeated harassment, control the frequency of communication, and automatically flag potential violations when collectors exceed permitted standards. This approach helps fintech companies prevent abusive practices before they occur. It also provides regulators with structured data for monitoring, evaluation, and enforcement.

Decentralized identity protection can also improve consumer privacy in digital lending services. Instead of exposing sensitive personal data directly to multiple parties, consumers' identities can be verified through secure and privacy-preserving digital identity mechanisms. This approach reduces the risk of personal data misuse by illegal fintech platforms or irresponsible debt collectors. Therefore, blockchain-based identity management can support stronger data protection while maintaining efficiency in digital financial services. The findings also indicate that blockchain governance is essential for improving accountability among fintech actors. Regulators, fintech providers, consumer protection agencies, and law enforcement institutions should be connected through an integrated supervisory framework to enable more transparent monitoring and coordinated oversight.

This collaborative governance model can improve transparency, accelerate complaint handling, and strengthen institutional responses to debt collector misconduct. In this context, blockchain functions not only as a technical tool but also as a governance mechanism for building trust in the digital financial ecosystem. These findings support SDGs 8 by promoting safer, fairer, and more inclusive digital financial services that encourage public trust and sustainable economic participation. They also contribute to SDGs 16 by strengthening justice, institutional accountability, and access to legal protection for consumers. Therefore, the integration of blockchain-based supervision, smart contracts, decentralized identity protection, and collaborative governance

can become a strategic solution for reducing debt collector misconduct while enhancing consumer confidence in Indonesia's digital financial services industry.

Table 2 compares conventional consumer protection mechanisms with the proposed blockchain-based approach.

Table 2. Comparison between Conventional and Blockchain-Based Consumer Protection Mechanisms

Aspect	**Conventional Consumer Protection**	**Proposed Blockchain-Based Protection**	**Expected Improvement**
Complaint Recording	Manual and fragmented reporting	Immutable blockchain audit trail	More reliable and verifiable complaint records
Evidence Verification	Depends on screenshots and user documentation	Tamper-resistant distributed ledger	Higher evidence integrity and transparency
Monitoring of Debt Collectors	Periodic and reactive supervision	Continuous real-time transaction monitoring	Faster detection of misconduct
Consumer Data Protection	Centralized data storage	Decentralized identity management	Reduced risk of personal data misuse
Complaint Resolution	Administrative and time-consuming procedures	Smart contract-assisted complaint workflow	Faster and more consistent dispute handling
Regulatory Transparency	Limited information sharing among institutions	Shared blockchain governance platform	Improved accountability and inter-agency coordination

Table 2 demonstrates that the proposed blockchain-based framework provides several advantages over conventional consumer protection mechanisms. While existing approaches primarily rely on centralized administration and manual verification, blockchain introduces immutable records, automated compliance, decentralized identity management, and transparent governance. These features strengthen regulatory accountability, reduce opportunities for evidence manipulation, and improve the efficiency of complaint handling. Consequently, blockchain should be viewed not merely as a technological innovation but as an enabling governance infrastructure capable of enhancing consumer protection within Indonesia's digital financial services ecosystem.

Beyond the technical advantages of blockchain, the findings indicate that effective consumer protection requires the integration of technological innovation with regulatory governance. Blockchain should not be viewed solely as a digital infrastructure for recording transactions, but also as a mechanism for improving coordination among regulators, fintech providers, consumer protection agencies, and other stakeholders. Such integration enables more consistent monitoring, strengthens institutional accountability, and supports evidence-based decision-making when handling consumer complaints.

The proposed approach also demonstrates that consumer protection in digital financial services extends beyond preventing misconduct. It emphasizes the creation of a trustworthy ecosystem in which consumer rights, data privacy, and procedural fairness are protected throughout the debt collection process. By combining immutable records, automated compliance mechanisms, secure identity management, and collaborative oversight, blockchain can reduce information asymmetry while enhancing transparency and public confidence in fintech services.

Overall, the findings suggest that blockchain has the potential to reshape consumer protection from a predominantly reactive regulatory approach into a proactive governance framework. Rather than responding only after violations occur, blockchain-based mechanisms facilitate continuous monitoring, reliable evidence management, and more efficient regulatory coordination. This integrated approach provides a stronger foundation for promoting accountability, protecting consumers, and supporting the sustainable development of Indonesia's digital financial services industry.

5. MANAGERIAL IMPLICATION

The findings of this study provide important implications for regulators in strengthening consumer protection within the digital financial services industry. Regulatory authorities, particularly the Financial Services Authority, need to develop a more adaptive and technology-based supervisory mechanism to monitor fintech debt collection practices. The proposed blockchain-based audit trail can assist regulators in recording and verifying debt collection activities in a transparent and tamper-resistant manner. This mechanism may help reduce evidence manipulation, improve complaint verification, and support stronger legal enforcement against fintech platforms or debt collectors that violate consumer protection standards.

For fintech companies, the results highlight the importance of implementing ethical, transparent, and accountable debt collection procedures. Fintech providers should not only comply with existing regulations, but also integrate smart contract-based rules to control collection time, communication frequency, and approved collection channels. By adopting blockchain-supported complaint mechanisms and decentralized identity protection, fintech companies can reduce the risk of personal data misuse and improve consumer trust. These managerial actions are essential to ensure that digital financial innovation does not harm consumers, but instead creates a safer and more responsible financial ecosystem.

For consumer protection agencies and related institutions, this study emphasizes the need to improve digital literacy, complaint assistance, and inter-agency collaboration. Consumer protection agencies should educate the public about their legal rights, safe fintech usage, and procedures for reporting abusive debt collection practices. In addition, collaboration between regulators, fintech companies, consumer protection institutions, and law enforcement agencies should be strengthened through integrated digital monitoring systems. These efforts can support SDGs 8 by encouraging inclusive and secure digital economic growth, while also supporting SDGs 16 by promoting justice, institutional accountability, and stronger legal protection for consumers.

Overall, the managerial implications of this study highlight that effective consumer protection in the fintech industry requires a collaborative approach that integrates regulatory reform, technological innovation, and institutional coordination. The adoption of blockchain-based governance can strengthen transparency, accountability, and consumer trust while supporting more efficient regulatory oversight and ethical business practices. Consequently, the proposed approach provides a practical foundation for developing a safer, more resilient, and sustainable digital financial ecosystem that benefits regulators, fintech providers, and consumers alike.

6. CONCLUSION

This study concludes that consumer protection against fintech debt collector misconduct in Indonesia remains an urgent issue in the digital financial services industry. The findings show that intimidation, threats, psychological pressure, and misuse of personal data still occur due to weak regulatory enforcement and limited supervision, particularly among illegal and unregistered fintech platforms. Although Indonesia already has legal foundations through consumer protection regulations and policies issued by the Financial Services Authority, the rapid growth of fintech services has not been fully balanced by adaptive monitoring and effective law enforcement mechanisms.

This study also highlights that conventional regulatory approaches are no longer sufficient to address the complexity of digital financial misconduct. Therefore, a more technology-driven consumer protection model is needed by integrating blockchain-based audit trails, smart contract-supported complaint mechanisms, decentralized identity protection, and artificial intelligence for early detection of unethical collection practices. These technologies can improve transparency, accountability, data security, and traceability in debt collection activities, while also strengthening consumer trust in the fintech ecosystem. This approach aligns more closely with the scope of blockchain governance, blockchain applications, and digital consumer protection.

Furthermore, the findings provide practical implications for regulators, fintech companies, and consumer protection agencies. Regulators need to strengthen digital supervision and inter-agency data integration, while fintech companies must ensure ethical debt collection practices and transparent consumer complaint handling. Consumer protection agencies should also improve public financial literacy and digital rights awareness to reduce consumer vulnerability. These efforts support SDGs 8 by encouraging safer and more inclusive digital economic growth, and SDGs 16 by strengthening justice, institutional accountability, and legal protection. Future research is recommended to develop and validate a concrete blockchain-based consumer protection

framework using empirical data, system architecture, and measurable performance indicators.

7. DECLARATIONS

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7.2. Author Contributions

Conceptualization: IR ; Methodology: IR; Software: IR; Validation: IR; Formal Analysis: IR; Investigation: IR; Resources: IR; Data Curation: IR; Writing Original Draft Preparation: IR; Writing Review and Editing: IR; Visualization: IR; The author has read and approved the manuscript.

7.3. Data Availability Statement

The data presented in this study are available on request from the corresponding author.

7.4. Funding

The author received no financial support for the research, authorship, and/or publication of this article.

7.5. Declaration of Conflicting Interest

The authors declare that they have no conflicts of interest, known competing financial interests, or personal relationships that could have influenced the work reported in this paper.

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