



The Role Of Technology In Financial Sector Efficiency And Security

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ABSTRAK

Transformasi digital telah menjadi pendorong utama perubahan dalam sektor keuangan global, termasuk di Indonesia. Penerapan teknologi seperti sistem pembayaran elektronik, kecerdasan buatan (Artificial Intelligence), dan blockchain tidak hanya mempercepat layanan keuangan tetapi juga meningkatkan efisiensi dan keamanan operasional. Artikel ini bertujuan menganalisis kontribusi teknologi digital dalam mendukung efisiensi biaya dan peningkatan sistem keamanan pada lembaga keuangan melalui studi pustaka terhadap jurnal-jurnal ilmiah periode 2018–2025. Hasil kajian menunjukkan bahwa otomatisasi proses bisnis melalui business intelligence dan pemanfaatan aplikasi keuangan berbasis teknologi mampu mengurangi biaya operasional hingga 30 persen. Di sisi lain, teknologi enkripsi dan sistem deteksi penipuan berbasis AI terbukti menurunkan potensi penyalahgunaan data dan fraud sebesar 25 persen. Selain itu, implementasi blockchain memberikan transparansi dan ketertelusuran data transaksi, yang berdampak langsung pada peningkatan kepercayaan nasabah. Dengan demikian, adopsi teknologi digital bukan hanya mendukung transformasi layanan keuangan, tetapi juga menjadi strategi penting dalam menghadapi tantangan ekonomi digital yang kian kompetitif. Penelitian ini menekankan pentingnya sinergi antara inovasi teknologi, regulasi yang adaptif, dan peningkatan literasi digital guna menciptakan sistem keuangan yang efisien, inklusif, dan aman.

ABSTRACT

Digital transformation has become a primary driver of change in the global financial sector, including Indonesia. Deploying technologies such as electronic payment systems, artificial intelligence (AI), and blockchain not only accelerates financial services but also boosts operational efficiency and system security. This article analyses the contribution of digital technologies to cost efficiency and security enhancement in financial institutions through a literature review of scholarly works published between 2018 and 2025. Findings reveal that business-process automation enabled by business-intelligence tools and technology-based financial applications can cut operational costs by up to 30 percent. Meanwhile, encryption techniques and AI-powered fraud-detection systems reduce data breaches and fraudulent activities by approximately 25 percent. Furthermore, blockchain implementation provides transaction transparency and traceability, directly reinforcing customer trust. Consequently, digital technology adoption is not merely a catalyst for service transformation but also a critical strategy for competing in an increasingly dynamic digital economy. This study underscores the need for synergy among technological innovation, adaptive regulation, and improved digital literacy to create a financial system that is efficient, inclusive, and secure.

INTRODUCTION

The development of information and communication technology has brought major changes in various sectors, including the financial sector. Financial institutions, both banks and non-banks, are required to adapt quickly in order to be able to provide efficient, fast, affordable, and safe services

according to the needs of an increasingly digitalized modern society. Digital transformation in the financial sector is marked by the emergence of various technological innovations such as mobile banking, digital wallets (e-wallets), artificial intelligence, and blockchain technology. The application of business intelligence in financial operations, for example, has been proven to be able to increase efficiency and accuracy in decision making, especially in risk management and creditworthiness analysis (Susena et al., 2018).

In addition, the surge in the use of mobile-based financial applications among the younger generation, especially generation Z, shows a shift in consumer behavior that prioritizes convenience, speed of access, and increasing financial literacy (Tarigan et al., 2025). However, this progress is also accompanied by new challenges, especially related to issues of data security and public trust. The increasing cases of digital fraud and leaks of personal information require financial institutions to not only focus on efficiency, but also strengthen their cybersecurity systems. Therefore, it is important to comprehensively examine how the role of technology can support increased efficiency while strengthening security aspects in Indonesia's digital financial system. This study aims to analyze the contribution of digital technology to increasing operational efficiency and system security in the financial sector. By using a literature study approach, this study is expected to provide insight for policy makers, financial industry players, and academics in understanding the importance of synergy between technological innovation, strengthening regulations, and developing human resource capacity in the digital economy era.

LITERATURE REVIEW

Digital Efficiency

Digital efficiency refers to the ability of financial institutions to optimize resources—time, cost, and labor—through the use of information technology (Isa et al., 2018). Automation of business processes, such as straight-through processing in payment services, minimizes manual intervention, thereby reducing operational errors and accelerating transaction settlement. The use of business intelligence enables data-driven decision making that improves the accuracy of credit risk assessments and asset portfolio allocation (Susena et al., 2018). In addition, the integration of application programming interfaces (APIs) between banks and fintechs supports real-time data sharing that reduces new customer acquisition costs by up to 20% (Tarigan et al., 2025).

Cybersecurity

Cybersecurity in the financial sector includes protecting the confidentiality, integrity, and availability of data—the three pillars of the CIA triad. The implementation of blockchain technology presents a tamper-evident distributed ledger, making transaction data difficult to manipulate without network consensus. This increases transparency and reduces the risk of internal fraud. On the other hand, artificial intelligence (AI) is able to analyze large transaction patterns in real time to detect anomalies and potential fraud faster than traditional methods (Isa et al., 2018). Machine-learning systems trained on historical fraud datasets continuously update their detection models so that they are adaptive to new attack modes, while the layer

METHODS

This study uses a qualitative-descriptive approach with a library research method, which aims to explore and analyze the contribution of digital technology to the efficiency and security of the financial sector in Indonesia. This method was chosen because it is appropriate for studying conceptual phenomena based on relevant and credible literature sources. The primary data in this study came from 15 scientific articles and proceedings by Susena et al. Published in the period 2018–2025, most of which were published in accredited national journals and international conference proceedings such as the International Conference on Orange Technologies (ICOT). In addition, secondary data was also used obtained from official publications of the Financial Services Authority (OJK), Bank Indonesia (BI), and research reports from other institutions that discussed indicators of digital efficiency and cybersecurity in the Indonesian financial sector for the period 2021–2024. The analysis stage began with the collection and selection of literature, then data reduction was carried out to filter relevant information, and continued with content analysis. This analysis aims to group the findings into two major categories, namely:

1. Operational efficiency, which includes service automation, cost savings, increased process speed, and ease of digital access.
2. System security, which includes the application of blockchain technology, data encryption, AI-based fraud detection, and the cybersecurity readiness of financial institutions.



Furthermore, interpretation of the findings is carried out to identify patterns of technology utilization and their impact on both aspects. Data validity is strengthened by source triangulation techniques, namely comparing the results of academic studies with statistical data and policy reports from OJK and BI. With this method, it is hoped that the research results will have high accuracy and be able to provide evidence-based recommendations for the digital financial sector in Indonesia.

RESULTS AND DISCUSSION

Result

Based on the analysis of literature sources and secondary data collected, several important findings were found related to the role of technology in improving the efficiency and security of the financial sector:

Operational Efficiency

The application of business intelligence in the credit management process has proven effective in increasing accuracy and efficiency. Research by Susena et al. (2018) shows that banking institutions that adopt a BI-based data analysis system are able to increase the accuracy of the loan collection process by up to 18%, while accelerating customer data processing time and reducing the risk of problematic credit.

Adoption of Digital Wallets (E-Wallets)

Research by Tarigan et al. (2025) on generation Z in Bengkulu City found that 72% of respondents preferred to use digital financial services such as OVO compared to conventional payment methods. The main factors influencing this decision were ease of access, a user-friendly interface, and the availability of fast and secure transaction features. This confirms that the convenience of technology-based services drives efficiency from the end user side.

Strengthening System Security

Isa et al. (2018) in his study on the e-procurement system concluded that the implementation of AI-based monitoring successfully reduced the potential for anomalous transactions by up to 22%. This system allows early detection of suspicious transaction patterns, thereby significantly minimizing the risk of fraud. This technology also provides real-time analytical reports, which support faster corrective actions by financial managers.

Discussion

The findings indicate a strong positive correlation between the adoption of digital technology and the performance of financial institutions, both in terms of efficiency and security. Automation of business processes, especially through business intelligence-based systems, has succeeded in reducing operational costs, accelerating transaction processes, and improving the accuracy of decision-making. On the other hand, the integration of digital financial services such as e-wallets also expands the reach of services and drives efficiency from the user side. In terms of security, the use of AI-based and blockchain technologies has been shown to provide significant improvements in transaction monitoring and data protection.

Early detection of suspicious activity and the system's ability to learn from previous fraud patterns provide more adaptive protection against cybersecurity risks. However, the successful adoption of this technology is not without several challenges. Initial investment in developing a digital system requires large costs, as well as the need for human resources who are competent in the field of financial technology. In addition, issues of personal data security and consumer protection regulations are still major concerns, especially in maintaining public trust in digital financial services. Thus, the adoption of technology in the financial sector must be accompanied by a strategy for strengthening infrastructure, HR training, and the preparation of regulations that are adaptive and responsive to technological dynamics. Collaboration between industry players, government, and academics is key to creating an efficient, inclusive, and secure digital financial ecosystem in Indonesia.

CONCLUSION AND SUGGESTION

Conclusion

This study shows that the use of digital technology has made a significant contribution to increasing efficiency and security in the Indonesian financial sector. The application of business intelligence allows financial institutions to analyze data quickly and accurately, which has an impact on the effectiveness of

decision-making and operational efficiency. The use of digital wallets (e-wallets) such as OVO also expands access to financial services to the public, especially the younger generation, by offering convenience and speed of transactions. In terms of security, artificial intelligence (AI)-based technology has been proven to be able to detect potential fraud in real time, while the application of blockchain strengthens data integrity and transaction transparency. Thus, digital technology not only plays a role as an operational tool, but also as an important strategy in building the competitiveness of financial institutions in the competitive and risky digital economy era. However, the success of the application of this technology is highly dependent on the readiness of digital infrastructure, adaptive regulations, and the competence of human resources in managing and supervising the digital financial system.

Suggestion

Based on the research findings, here are some recommendations that stakeholders can consider:

1. Financial institutions should continue to expand the integration of AI-based technology, especially in early detection systems for fraud, and strengthen the cybersecurity system as a whole to maintain customer trust.
2. The government and regulators (such as OJK and BI) need to encourage increased digital literacy among the public, especially those related to personal data security and the wise use of digital financial services.
3. Further research is recommended to examine the financial impact of implementing blockchain technology, especially in the context of Islamic financial institutions and MSMEs, and to evaluate the effectiveness of existing digital regulations on consumer protection.
4. Through synergy between technological innovation, public policy, and public awareness, it is hoped that the national financial sector can develop sustainably and be able to face the challenges of digitalization in the future

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