

Digital Transformation of Finance in Educational Institutions: A Systematic Literature Review on Fintech Implementation

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Abstract

This study aims to systematically examine the implementation of financial technology (fintech) and cashless payment systems (cashless society) in the context of Islamic boarding schools (pesantren) as an effort to minimize the risks associated with conventional transactions. The method used is a Systematic Literature Review (SLR) with a PRISMA approach. Data were obtained from the Google Scholar database using the keywords ("financial technology" OR fintech) AND ("digital payment" OR "cashless society") AND ("Islamic boarding school" OR pesantren). The inclusion criteria comprised empirical research articles published in the last five years and not in the form of SLR articles. The selection process resulted in seven articles that were analyzed using a thematic approach. The findings indicate that the implementation of fintech-based payment systems in pesantren can reduce the risk of physical money loss, improve the accuracy of real-time transaction recording, strengthen parental monitoring mechanisms over students' financial usage, and enhance transaction efficiency within the pesantren environment. Furthermore, digital systems strengthen transparency and accountability in pesantren financial management through the availability of documented transaction trails. However, successful implementation is highly influenced by the readiness of technological infrastructure, users' level of digital literacy, and internal policy support from the pesantren. This study provides a conceptual foundation for developing safer, more transparent, and sustainable digital financial systems in pesantren.

1. Introduction

The development of digital technology has driven significant transformation in the global financial system, particularly through the emergence of financial technology (fintech). Fintech is understood as the integration of technology with financial services aimed at improving the efficiency, security, and inclusivity of transactions (Arner et al., 2015; Ozili, 2018). One of the main manifestations of fintech is the cashless payment system (cashless society), which enables transactions to be conducted electronically without the use of physical money (Suri & Jack, 2016; World Bank, 2020). Various studies indicate that cashless systems can enhance transaction transparency, reduce administrative costs, and minimize the risks of fund loss and misuse (Hasan et al., 2020; Gomber et al., 2018).

In the context of developing countries, the implementation of digital payment systems has been proven to contribute to increased financial inclusion and strengthened microfinancial governance (Demirgüç-Kunt et al., 2018). Suri and Jack's (2016) study in Kenya shows that the use of mobile-based electronic money can reduce household vulnerability to financial shocks. Meanwhile, Ozili (2018) emphasizes that fintech adoption plays an important role in expanding access to financial services for groups that were previously unreachable by conventional banking systems. Thus, digital financial transformation not only impacts the banking and business sectors but also social and educational institutions.

Educational institutions are among the sectors that have begun adopting cashless

payment systems, particularly to improve the efficiency of operational financial management and student transactions (Lai & Shi, 2015; Dahlberg et al., 2015). The use of cash in educational environments is often associated with risks of loss, manual recording prone to human error, and low transparency of fund flows (Susilo et al., 2021). Digital payment systems enable automatic and real-time recording, thereby facilitating financial audit and monitoring processes by both management and parents/guardians (Gomber et al., 2018; Hasan et al., 2020).

In the Indonesian context, Islamic boarding schools (pesantren) are Islamic educational institutions that play a strategic role in character building and human resource development. However, most pesantren still use conventional cash-based transaction systems in managing students' finances, including pocket money, daily expenses, and educational fees (Rohman & Wahyuni, 2020). This condition creates various problems, such as students losing physical money, error-prone manual recording, and limited parental ability to accurately monitor their children's financial usage (Huda et al., 2022). These issues have the potential to disrupt students' financial stability and weaken the accountability of pesantren fund management.

Along with the development of the cashless society concept and digital payment technology, opportunities have emerged for pesantren to adopt fintech-based financial systems to improve transparency, efficiency, and transaction risk control (Arner et al., 2017; Demirgüç-Kunt et al., 2018). Several studies show that the implementation of digital payment systems in educational environments and closed communities can reduce the risk of money loss, minimize data manipulation, and strengthen financial reporting systems (Dahlberg et al., 2015). However, research findings related to fintech implementation in pesantren are still fragmented and have not been systematically integrated, both in terms of benefits, challenges, and impacts on conventional transaction risk management.

Therefore, a comprehensive study using a

Systematic Literature Review (SLR) approach is needed to identify, evaluate, and synthesize research findings related to the implementation of financial technology in the context of digital financial transformation in pesantren. The SLR approach was chosen because it can provide an overall picture of research trends, patterns of empirical findings, and research gaps that have not been widely explored (Kitchenham & Charters, 2007). Thus, this study is expected to provide a strong theoretical and empirical foundation for developing a more transparent, accountable, and low-risk financial system in pesantren.

Based on this background, this study is directed to address the following research questions:

1. What are the characteristics and trends of research related to the implementation of financial technology and cashless systems in educational environments, particularly in pesantren?
2. To what extent can the implementation of digital payment systems minimize conventional transaction risks such as physical money loss and manual recording errors?
3. What are the challenges and opportunities of fintech implementation in the digital financial transformation of pesantren based on scientific literature findings?

2. Literature Review

The implementation of financial technology (fintech) and digital payment systems in Islamic boarding schools (pesantren) has become an increasingly relevant topic in recent years. Research by Setiawan et al. (2025) shows that the application of fintech education and cashless payment systems at Pondok Pesantren Darussalam Banyuwangi has improved transaction efficiency and financial transparency, as well as encouraged the pesantren's economic independence.

The implementation of a cashless system has also had a positive impact on students' financial behavior. Putri et al. (2025) found that the use of digital payment systems at Pondok

Pesantren Idrisiyyah Putri Tasikmalaya helped students manage their personal finances in a more disciplined and responsible manner.

Furthermore, digital financial literacy is an important factor in supporting the adoption of fintech in pesantren. Aqil et al. (2025), through a community service program at Dayah Darul Hikmah, Aceh Besar, successfully improved students' understanding of sharia-compliant digital financial services through training and fintech application simulations.

However, challenges in implementing fintech in pesantren remain, such as limited digital infrastructure and low financial literacy among students and pesantren administrators. Hasan et al. (2025) emphasize the need for effective educational strategies to enhance Islamic banking literacy and public trust in digital financial services.

In the educational context, Hasan (2025) examined the implementation of fintech in improving educational administration services at Pondok Pesantren Mamba'ul Huda Kaliabu, Magelang, and found that the digitalization of educational administration increased data efficiency and accuracy.

Another study by Priyanta et al. (2024) in Klaten shows that digital-based education financing management facilitates the payment of monthly fees (syahriah) and financial monitoring by students' guardians.

The integration of fintech and social media has also been an effective strategy in developing halal businesses in pesantren. Usman (2023) revealed that the use of fintech and social media by pesantren in Central Sulawesi helped map market demand and develop products that align with consumer needs.

In efforts to improve financial literacy among students, collaboration between pesantren, Islamic financial institutions, and halal fintech startups needs to be continuously encouraged. Community-based approaches, such as the establishment of digital cooperatives, can serve as practical platforms for managing sharia-compliant digital finances.

The implementation of cashless systems in pesantren also supports the modernization of

Islamic education. With this system, pesantren financial management becomes more efficient, and students can learn to manage their finances better—an essential skill in the digital era.

However, the success of fintech implementation in pesantren highly depends on the readiness of technological infrastructure, users' level of digital literacy, and internal policy support from the pesantren. Without proper management, the potential benefits of fintech cannot be optimally achieved and may even introduce new risks.

3. Research Methods

This study employs the Systematic Literature Review (SLR) method following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to ensure that the processes of literature search, selection, and analysis are conducted systematically, transparently, and replicably. The research stages include study identification, screening, eligibility assessment, and determination of articles to be included in the review (Haddaway et al., 2022).

Search Strategy

The research data were obtained from the Google Scholar database because it provides broad coverage of reputable scholarly articles, both nationally and internationally. The search process was conducted using the following combination of keywords:

("financial technology" OR fintech) AND ("digital payment" OR "cashless society") AND ("Islamic boarding school" OR pesantren)

The search was limited to publications from the last five years (2021–2025) to ensure the relevance and novelty of the research findings.

Inclusion and Exclusion Criteria

The inclusion criteria for this study were:

- Empirical research articles (quantitative, qualitative, or mixed methods).
- Articles discussing financial technology, digital payment systems, or cashless society in the context of education or religious institutions/pesantren.

- c. Articles published within the last five years.
- d. Articles available in full text.
- e. Articles that were not SLR or meta-analysis studies.

The exclusion criteria included:

- a. Articles that were not relevant to fintech, digital payments, or pesantren.
- b. Articles that could not be fully accessed.
- c. Articles in the form of systematic reviews, opinions, editorials, or non-scientific proceedings.
- d. Duplicate articles from the search results.

Study Selection Process (PRISMA Flow)

Based on the initial search results on Google Scholar, a total of 2,530 articles were identified. Subsequently, articles that were not relevant based on titles and abstracts were removed, resulting in the elimination of 2,012 articles before further screening. Thus, 518 articles remained for the screening stage.

At the screening stage, titles and abstracts were evaluated for their relevance to the research focus, leading to the exclusion of 44 articles that were not aligned with the study topic. Next, 474 articles were attempted to be accessed in full text. However, 459 articles could not be obtained in full or did not meet the accessibility criteria.

The next stage was the eligibility assessment of 15 articles that were successfully obtained in full. Of these, 8 articles were excluded because they were citation-based articles or did not meet the established methodological criteria (e.g., they were literature reviews or did not substantially address the context of fintech and pesantren). Consequently, 7 articles met all inclusion criteria and were used as the main sources for this systematic review.

Data Analysis Technique

The included articles were analyzed using a thematic analysis approach by grouping the research findings into several main themes, including:

- a. forms of fintech implementation in pesantren or Islamic educational institutions,

- b. the impact of digital payment systems on conventional transaction risks,
- c. effects on transparency and accountability of financial management, and
- d. challenges and barriers to cashless system implementation.

The results of the literature synthesis were used to identify patterns of findings, research gaps, and practical implications for the development of digital financial systems in Islamic boarding schools (pesantren).

4. Results and Discussion

4.1. System Comparison

This discussion focuses on the comparison between traditional cash-based financial management systems and financial technology (fintech)-based management systems in the context of student transactions within Islamic boarding schools (pesantren). The comparison concentrates on four main aspects: security, recording, monitoring, and transaction efficiency.

From the security perspective, traditional cash-based management systems have relatively high risk levels. Physical money is vulnerable to loss, theft, or damage due to environmental factors such as water or fire. Moreover, when money is lost, it is difficult to trace or recover because there is no systematically documented transaction trail. In contrast, in technology-based management systems, students' funds are stored in the form of digital balances linked to specific accounts or cards. Losing a card or transaction medium does not necessarily result in loss of funds, as the balance can be secured through authentication systems and account blocking mechanisms. This indicates that fintech systems can reduce the physical risks inherent in cash usage and enhance the protection of students' financial assets.

In terms of recording, traditional systems still rely on manual bookkeeping, such as cash books or written records. This recording model is prone to human error, including miscalculations, failure to record transactions, or potential data manipulation. Additionally, manual recording is time-consuming and makes

quick reconciliation difficult. In contrast, technology-based systems implement automatic and real-time recording, where each transaction is directly recorded digitally in the system. Every expense and income can be traced in detail based on time, amount, and transaction type. Thus, fintech systems provide higher accuracy and support transparency in pesantren financial management.

The monitoring aspect also shows significant differences between the two systems. In cash-based systems, parents and pesantren management do not have direct access to information on students' money usage. Control over students' consumption patterns is only approximate and heavily dependent on verbal reports or direct supervision. This condition weakens control functions and potentially leads to unfocused use of money. Conversely, technology-based systems enable notifications and direct transaction reports to parents or guardians through digital applications. This feature allows for more structured and transparent consumption control while strengthening external oversight of students' financial management. With fast and accurate access to information, parents can actively guide their children's consumption behavior.

From the transaction efficiency perspective, traditional systems often cause long queues at cafeterias or cashier points because payments require time to count money and provide change. This situation not only reduces students' learning time effectiveness but also increases the potential for transaction errors. In contrast, technology-based systems utilize fast payment methods such as QRIS or digital cards (tap cards), allowing transactions to occur more quickly without the need for change. This efficiency not only impacts service speed but also enhances convenience for students and pesantren business unit managers.

Overall, this comparison shows that technology-based financial management systems have more significant advantages than conventional cash systems, particularly in terms of security, recording, monitoring, and efficiency. Fintech implementation in pesantren

has the potential to minimize conventional transaction risks that have long been faced, such as physical money loss, recording errors, and weak parental supervision. However, the application of technology-based systems still requires infrastructure readiness, digital literacy, and internal policy support from pesantren to ensure that benefits can be optimally and sustainably realized.

4.2. Analysis of the Benefits of Financial Technology in Pesantren

The implementation of financial technology (fintech)-based payment systems in pesantren provides various strategic benefits for students, pesantren management, and parents. These benefits are not only technical in terms of transactions but also impact financial governance, the formation of students' consumption behavior, and the improvement of institutional accountability.

From the students' perspective, digital payment systems reduce dependence on cash, which is vulnerable to loss, theft, or misplacement. Digital balances stored in the system allow students to conduct transactions more safely and in a controlled manner. Furthermore, using payment cards or applications trains students to adapt to modern financial technology developments while fostering digital financial literacy from an early age. With documented transaction histories, students can also learn to manage their expenses in a more structured and responsible way.

For pesantren management, fintech systems facilitate financial administration. Every transaction is recorded automatically and in real-time, simplifying data reconciliation, financial reporting, and internal audits. This reduces the burden of manual recording, which is prone to errors and manipulation. Additionally, integrated transaction data can serve as a basis for decision-making, such as setting cafeteria pricing policies, regulating students' pocket money, or planning operational budgets. Thus, fintech strengthens internal control systems and enhances the professionalism of pesantren financial

governance.

From the parents' perspective, digital payment systems enable better transparency and supervision of students' money usage. Through transaction notifications or online-accessible periodic reports, parents can directly and accurately observe their children's consumption patterns. This feature encourages parental involvement in students' financial control while supporting the development of financial discipline. With clear control mechanisms, the risk of using money for purposes inconsistent with educational goals can be minimized.

Institutionally, fintech implementation in pesantren also contributes to accountability and transparency. Digital systems create an audit trail that can be traced at any time, strengthening public trust in pesantren fund management. This is important because pesantren not only manage students' funds but also often receive donations or assistance from the public and government. With digital payment systems, pesantren have the opportunity to integrate the management of educational, operational, and social funds within a controlled system.

Moreover, fintech payment systems have the potential to improve pesantren's economic efficiency. Fast transactions without the need for change reduce queues in cafeterias or cooperatives, allowing students to use their time more effectively for learning and worship. This efficiency also enhances the quality of internal services and reduces potential conflicts arising from transaction errors.

However, these benefits can only be optimally achieved if supported by adequate technological infrastructure, users' digital literacy, and clear internal regulations within pesantren. Without proper management, fintech systems could introduce new risks such as technological dependence, network disruptions, or low user understanding. Therefore, fintech implementation in pesantren must be accompanied by educational policies, guidance, and strengthened data security systems to ensure sustainable benefits.

5. Conclusion and Recommendations

5.1. Conclusion

Based on the results of the Systematic Literature Review (SLR) on studies discussing the implementation of financial technology and digital payment systems in the context of pesantren and Islamic educational institutions, it can be concluded that digital financial transformation through cashless systems plays an important role in minimizing conventional transaction risks. Major risks associated with cash-based systems—such as physical money loss, manual recording errors, and weak monitoring mechanisms—can be significantly reduced through technology-based payment systems.

In terms of security, digital payment systems provide better protection for students' funds because balances are stored within the system and can be controlled through authentication mechanisms and transaction records. Regarding recording, fintech enables automatic and real-time financial administration, improving data accuracy and transparency in pesantren financial management. Meanwhile, in terms of monitoring, digital systems provide broader access to information for both pesantren management and parents to oversee students' money usage, supporting more controlled and responsible consumption behavior.

Furthermore, fintech implementation in pesantren also benefits transaction efficiency and institutional governance. Fast payment processes without change enhance the effectiveness of internal services, while the availability of an audit trail strengthens institutional accountability in managing students' funds. These findings indicate that fintech functions not only as a payment tool but also as a risk control instrument and a means to improve the quality of pesantren financial management.

Nevertheless, the literature also shows that the success of technology-based payment system implementation highly depends on infrastructure readiness, users' digital literacy, and internal policy support from pesantren. Without proper management, fintech's

potential benefits may not be fully realized and could even create new risks, such as technological dependence and operational disruptions due to network issues.

Overall, the results of this SLR confirm that fintech adoption in pesantren is a relevant and promising strategy for the digital financial transformation of Islamic educational institutions. This study provides a conceptual basis for pesantren managers and policymakers to develop safer, more transparent, and accountable payment systems. Future research is recommended to empirically examine the impact of fintech implementation in specific pesantren, including analysis of students' consumption behavior and the effectiveness of parental monitoring systems, to strengthen the empirical evidence of the findings synthesized in this study.

5.2. Recommendations

Future research is recommended to conduct empirical and context-specific studies on the implementation of fintech and cashless payment systems in selected pesantren using mixed-method or longitudinal approaches to examine their long-term impacts on students' financial behavior, parental monitoring effectiveness, institutional financial governance, and operational efficiency, while also considering factors such as digital infrastructure readiness, cybersecurity and data privacy risks, stakeholder technology acceptance, and alignment with Islamic finance principles, so as to provide stronger practical and theoretical evidence to support sustainable digital financial transformation in Islamic boarding schools.

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