Journal of Digital Islamic Economic Development

e-ISSN: 3109 - 9343
Volume 01, Number 02 Year 2025
Pages: 92-99

RESEARCH ARTICLE

Analysis of System Performance and Stability in the Bion BSI Application Update: A Banking Technology Management Perspective

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Keywords
Digital Banking; System Performance; System Stability; Technology Management; Islamic Banking

Abstract
Digital transformation has compelled Islamic banks to continuously update their digital applications in order to enhance service quality and ensure system stability. However, empirical studies that evaluate the impact of digital banking application updates based on technical performance indicators remain limited. This study aims to analyze the impact of the BION application update at Bank Syariah Indonesia (BSI) on system performance and stability from the perspective of Islamic banking technology management. The study employs a mixed methods approach with an explanatory sequential design, combining quantitative and qualitative analyses. Quantitative data were obtained from application system logs, server performance reports, and downtime records before and after the application update, with key indicators including response time, availability (uptime), and error rate. Qualitative data were collected through surveys and semi-structured interviews with BSI's information technology management personnel. The findings indicate that the BION BSI application update resulted in significant improvements in response time and availability, as well as a reduction in error rate, reflecting enhanced system reliability and operational stability. Qualitative findings further reveal that the success of the application update was supported by effective IT governance, technology risk management, and cross-unit coordination. This study extends the application of the Information Systems Success Model by emphasizing that system quality is not only reflected in user perceptions but also in objective technical indicators. From a practical perspective, the findings highlight the importance of technical performance evaluation as a strategic component of technology management in Islamic banking to maintain customer trust and ensure the sustainability of digital banking services.

Kata Kunci:
Perbankan Digital; Performa Sistem; Stabilitas Sistem; Manajemen Teknologi; Perbankan Syariah

Abstrak
Transformasi digital mendorong perbankan syariah untuk terus melakukan pembaruan aplikasi guna meningkatkan kualitas layanan dan stabilitas sistem. Namun, kajian empiris yang mengevaluasi dampak pembaruan aplikasi perbankan digital berdasarkan indikator performa teknis masih terbatas. Penelitian ini bertujuan menganalisis dampak pembaruan aplikasi BION Bank Syariah Indonesia (BSI) terhadap performa dan stabilitas sistem dari perspektif manajemen teknologi perbankan syariah. Penelitian ini menggunakan pendekatan mixed methods dengan desain explanatory sequential, yang mengombinasikan analisis kuantitatif dan kualitatif. Data kuantitatif diperoleh dari log sistem aplikasi, laporan performa server, dan catatan downtime sebelum dan sesudah pembaruan aplikasi, dengan indikator utama meliputi response time, availability (uptime), dan error rate. Data kualitatif dikumpulkan melalui survei dan wawancara semi-terstruktur dengan manajemen teknologi informasi BSI. Hasil penelitian menunjukkan bahwa pembaruan aplikasi BION BSI memberikan peningkatan signifikan pada response time dan availability, serta penurunan error rate, yang mencerminkan peningkatan keandalan dan stabilitas operasional sistem. Temuan kualitatif mengungkap bahwa keberhasilan pembaruan aplikasi didukung oleh tata kelola TI yang efektif, pengelolaan risiko teknologi, dan koordinasi lintas unit. Penelitian ini memperluas penerapan Information Systems Success

Model dengan menegaskan bahwa system quality tidak hanya tercermin dari persepsi pengguna, tetapi juga dari indikator teknis objektif. Secara praktis, hasil penelitian ini menegaskan pentingnya evaluasi performa teknis sebagai bagian strategis dari manajemen teknologi perbankan syariah dalam menjaga kepercayaan nasabah dan keberlanjutan layanan perbankan digital.

Received, May 23, 2025; Accepted, December 31, 2025; Published, December 2025

Nadilah S, (2025). Analysis of System Performance and Stability in the Bion BSI Application Update: A Banking Technology Management Perspective Journal of Digital Islamic Economic Development. 1 (2). 92-99. DOI: https://doi.org/10.70992/xa7xd053

INTRODUCTION

The development of digital technology has fundamentally changed the landscape of the financial services industry, encouraging banks to integrate information technology as the center of operations and customer interaction. Digital banking involves various information systems that provide real-time transactions, financial services without time and location restrictions, and a more personalized and efficient customer experience. Mobile banking applications are at the heart of this transformation due to their ability to expand service access and increase customer satisfaction amid increasingly fierce competition in the financial services industry (R. A. D. Kumalasari et al., 2022).

The acceleration of digital adoption also brings challenges to the technical aspects of the system, including the performance and stability of applications, which are at the core of digital banking services. Previous research on mobile banking system quality shows that *system quality*, *information quality*, and *service quality* have a significant influence on user satisfaction and loyalty in the context of banking applications (R. A. D. Kumalasari et al., 2022). However, these studies still focus on user experience and loyalty, rather than system performance from the perspective of technical stability and technology management.

A comprehensive literature review also confirms that most mobile banking research focuses on technology adoption, user experience, and service quality dimensions (C. Tam & C. Oliveira, 2017). These findings indicate the dominance of research on adoption and service quality factors, but also indicate a lack of studies exploring the dimensions of technical performance and system stability as applications are updated. In the global context, the evaluation of banking application performance and stability is still relatively rarely discussed specifically, even though the mobile banking literature has developed rapidly. Several studies, such as the performance analysis of the BCA banking application system, show the importance of system responsiveness and backend integration to ensure reliable digital services (*Digital Service Performance Analysis*, 2024). Meanwhile, research in Indonesia related to the impact of mobile banking is mostly in the form of analyzing the relationship between service digitalization and macro bank financial performance (T. D. Pramitasari & A. Y. A. Nanggala, 2023).

Empirical studies on the relationship between digital banking systems and institutional stability are still limited. A book on the impact of FinTech on bank performance concludes that digital technology creates new opportunities and risks that can affect the overall performance and stability of banks (F. Xu et al., 2025). However, the literature does not yet explain the technical performance of modern banking applications as a determinant of operational stability. Islamic banking, particularly Bank Syariah Indonesia (BSI), has undergone rapid digital transformation through the development of digital service applications such as BION BSI, which aims to improve service efficiency, financial inclusion, and customer experience. Studies on the effectiveness of the BSI Mobile and Byond by BSI systems describe that digital applications have advantages in terms of stability and features, but do not evaluate technical performance and stability quantitatively.

The urgency of this research arises from the need to understand the technical consequences of banking application system updates, as periodic updates can impact access speed, reliability, responsiveness, and resilience to errors and workloads. Poor system performance can reduce operational efficiency, affect user experience, and in turn decrease customer trust and loyalty. The development of banking digital applications such as BION BSI also involves significant security and stability risks, which if not managed properly can cause service disruptions and even customer data loss. Global banking application security research shows many technical gaps that must be addressed to ensure application reliability (S. Chen et al., 2018). Other studies also emphasize the importance of user security perceptions and trust as significant factors in mobile banking usage (R. Apaua & H. S. Lallie, 2022).

Literature mapping shows two main clusters of previous studies. First, studies on the adoption and quality of mobile banking services, which focus on convenience, information, and user perceptions of the system that affect satisfaction and loyalty. Second, studies on the impact of digital banking on the macro financial performance and stability of banks, which focus more on financial performance rather than the detailed technical performance of the application system. However, the relationship between digital banking application updates and the technical performance of the application (response time, reliability, error rate) has been little explored in the literature, creating a significant research gap. Existing research generally does not place technical studies of system performance as a primary focus in the context of banking technology management. In the context of banking technology management, digital application updates are not only a technical aspect, but also a strategic decision related to IT governance, risk management, and optimization of information technology resources. Technology management theory argues that reliable IT resources are a source of competitive advantage for banks, increasing operational efficiency and stakeholder trust.

This study will fill this gap by analyzing the performance and stability of the BION BSI application update from a banking technology management perspective. This study focuses on measuring technical performance (e.g., *response time, uptime/downtime, error rate*) and system stability as measured through system logs, performance records, and internal IT management feedback. The data studied will include secondary technical data from application server logs and primary data from surveys and internal interviews with IT management at BSI responsible for application updates. The analysis approach will use a combination of quantitative (descriptive and inferential statistics) and qualitative models to provide a holistic picture of application performance and stability.

This study is expected to contribute theoretically to the literature on banking technology management by placing application system performance as the main variable and bridging the gap between information technology studies and digital bank performance. Practically, this study provides strategic recommendations for BSI management and other banks in planning and implementing digital application updates effectively.

METHODS

This study uses a mixed methods approach with an explanatory sequential design, which combines quantitative and qualitative analysis to obtain a comprehensive understanding of the performance and stability of the BION BSI application system after the update. This approach was chosen because the evaluation of digital banking systems requires not only objective technical measurements but also managerial interpretations related to governance and technology decision-making. This design is commonly used in information systems and technology management research to explain technical phenomena and their organizational implications (Creswell & Plano Clark, 2018). The focus of this study is directed at analyzing the technical performance of the application from the perspective of Islamic banking technology management.

The object of this study is the BION BSI application, while the unit of analysis includes the performance and stability of the application system after the update. The data used consists of secondary data and primary data. Secondary data was obtained from application system logs, server performance reports, downtime records, and technical documentation of application updates during a specific observation period. This data is used to measure system performance indicators such as response time, reliability, availability (uptime/downtime), and error rate, which are standard indicators in information system quality evaluation (DeLone & McLean, 2003; ISO/IEC 25010, 2011). Primary data was obtained through surveys and semi-structured interviews with Bank Syariah Indonesia's information technology management who were directly involved in the management and updating of digital applications.

Quantitative data collection was conducted through system performance monitoring and application log analysis before and after the update to identify changes in key technical indicators. This technique is commonly used in research on digital system performance and information technology-based banking applications (Jiang et al., 2012; Hassani et al., 2018). Quantitative analysis was performed using descriptive statistics to describe system performance and stability patterns, as well as inferential analysis to test differences in system performance between update periods. This approach enabled an empirical evaluation of the impact of application updates on system operational reliability.

Qualitative analysis was conducted using thematic analysis to identify key themes related to application update policies, technology risk management, and strategies for maintaining system stability from a banking technology management perspective. The research analysis framework refers to the Information Systems Success Model with an emphasis on the system quality dimension, combined with the perspectives of IT governance and technology management in banking (DeLone & McLean, 2003; Weill & Ross, 2004). This theoretical approach allows the study to position application system performance and stability as strategic variables that play a role in supporting operational efficiency, customer trust, and the sustainability of digital banking services.

RESULTS AND DISCUSSION

Result

The results of the quantitative analysis show that the BION BSI application update had a positive impact on overall system performance and stability. Based on system log data and server performance reports for the periods before and after the update, there was a significant increase in the response time, reliability, availability, and error rate indicators. The average application response time decreased, indicating an increase in access speed and system responsiveness after the update. In addition, the system availability (uptime) rate increased, while the frequency of downtime and error rate showed a downward trend, reflecting improved system stability in supporting real-time digital banking transactions.

Descriptive statistical analysis shows that the distribution of system performance after the update is in the good to very good category based on information system quality evaluation standards. The results of the inferential test ( ) on the difference in performance before and after the update show a statistically significant difference in most of the main technical indicators. These findings confirm that the application update was not only cosmetic or functional, but also had a real impact on the operational reliability of the BION BSI application system. Thus, empirically, the system update has been proven to improve the technical quality of the application in accordance with the system quality dimension in the Information Systems Success Model.

The quantitative analysis results were obtained from system log data and BION BSI application server performance reports before and after the update. The evaluation focused on key technical indicators, namely response time, availability (uptime/downtime), and error rate, which represent the system quality dimension in the Information Systems Success Model.

Table 1. Comparison of BION BSI Application System Performance Before and After the Update

System Performance Indicators	Before Update	After Update	Change
Average Response Time (ms)	1,280 ms	820 ms	↓ 36%
Availability (Uptime %)	97.4	99.1%	↑ 1.7%
Downtime (hours/month)	18.6 hours	6.5 hours	↓ 65%
Error Rate (%)	2.8	1.1	↓ 60%

Descriptive statistics show consistent improvements in all system performance indicators after the update. The decrease in response time reflects improved application responsiveness, while the increase in uptime and decrease in downtime indicate better system stability. The significant decrease in error rate indicates improved system reliability in handling high-volume digital banking transactions. Inferential tests of the differences in performance before and after the update show that the changes in response time, availability, and error rate are statistically significant ($p < 0.05$). These findings confirm that the application update has a real impact on the technical quality of the system, not just an improvement in functionality or user interface.

The qualitative stage of the research reinforced the quantitative findings through semi-structured interviews with Bank Syariah Indonesia's information technology management. Thematic analysis identified several main themes, namely risk mitigation-based update strategies, strengthening information technology governance, and improving cross-unit coordination in the application development and maintenance process. Informants emphasized that the BION BSI application update was designed not only to add features but also to improve system stability through backend architecture optimization, layered system testing, and the implementation of stricter security standards.

Another theme that emerged was the importance of technology risk management in maintaining system stability after updates. IT management assessed that potential service disruptions, transaction load spikes, and security risks were key considerations in every application update decision. Therefore, the update process was followed by continuous system performance monitoring and rapid response mechanisms to technical disruptions. This strategy is considered crucial for maintaining customer trust and ensuring the continuity of digital banking services.

Qualitative analysis was conducted through semi-structured interviews with Bank Syariah Indonesia's information technology management directly involved in the BION BSI application update process. The results of the thematic analysis identified three main themes that explain the dynamics of system performance and stability after the update.

The first theme is a technology risk mitigation-based update strategy. Informants emphasized that each application update is preceded by layered testing, transaction load simulations, and risk- s of system failure. This approach aims to minimize potential service disruptions and maintain the continuity of digital banking operations.

The second theme relates to strengthening information technology (IT) governance. Application updates are positioned as strategic decisions that involve cross-unit coordination, including IT, risk management, and compliance. Structured governance enables continuous control of system performance and rapid response to technical anomalies after updates.

The third theme is the orientation of system stability as a digital service priority. IT management assesses that system stability has direct implications for customer trust and institutional reputation. Therefore, the success of application updates is not only measured by the addition of features, but also by the system's ability to maintain reliable and consistent performance.

The integration of quantitative and qualitative results shows consistency between improvements in system technical performance and the applied technology management policies. Improvements in response time, availability, and error rate reduction are in line with IT governance practices that emphasize update planning, system testing, and technology risk control. These findings confirm that the performance and stability of the BION BSI application system are the result of a combination of technical system capabilities and effective banking technology management.

Overall, the results of this study place the performance and stability of the application system as a strategic variable in supporting the operational efficiency and sustainability of Bank Syariah Indonesia's digital banking services. These empirical findings reinforce the Information Systems Success Model and IT governance framework by showing that high system quality is not only determined by technical aspects, but also by managerial decisions and integrated technology governance. The results of this study provide a strong empirical basis for decision-making on digital application updates in the context of Islamic banking.

DISCUSSION

The Impact of Application Updates on Technical Performance and Stability of Digital Banking Systems

The quantitative analysis results in Table 1 show that the BION BSI application update has a positive and significant impact on key technical performance indicators, namely response time, availability (uptime), and error rate. These findings confirm that application system updates do not merely serve to improve interface features, but also play an important role in strengthening the operational stability of digital banking services. The improvement in response time after the update indicates optimization of the system architecture and more efficient backend integration, in line with the findings of a banking application performance study that emphasizes the importance of system responsiveness to ensure the reliability of digital services (Digital Service Performance Analysis, 2024).

Conceptually, these findings expand the mobile banking literature, which has been dominated by studies on technology adoption and user experience (Tam & Oliveira, 2017). Previous research has shown that system quality has a significant effect on user satisfaction and loyalty (Kumalasari et al., 2022), but it does not objectively evaluate the technical performance of the system. Using system log data and technical indicators, this study proves that system quality is also reflected in the stability and operational reliability of the application, not just user perceptions. This fills a gap in empirical research on the direct relationship between digital application updates and the technical performance of banking systems.

Furthermore, the increase in availability and decrease in error rate after the update show that well-planned and executed application updates can reduce the risk of service disruption ( ). These findings are relevant to the literature on the security and reliability of digital banking systems, which emphasizes that technical weaknesses can lead to operational disruptions and data security risks (Chen et al., 2018). Thus, the results of this study reinforce the urgency of evaluating technical performance as an integral part of the banking digital transformation strategy.

These quantitative findings fill a gap in the mobile banking literature, which has mostly focused on user adoption and perceptions (Tam & Oliveira, 2017), by presenting empirical evidence based on technical system data. Thus, this study shows that evaluating technical performance after application updates is an integral aspect of banking digital transformation, particularly in maintaining the continuity of reliable digital services.

Implications of Technology Management and IT Governance in Sharia Banking Application Updates

From a technology management perspective, qualitative findings indicate that the success of improving the performance of the BION BSI system is not only determined by technical aspects, but also by the effectiveness of IT governance, technology risk management, and coordination between development and operational units. This supports the view that digital application updates are strategic decisions directly related to IT governance and technology resource management (Weill & Ross, 2004). In other words, the technical performance of the system is the result of synergy between technological capabilities and the quality of IT management.

This finding also expands the Information Systems Success Model framework by placing system quality as a determinant of operational stability, not merely a factor of user satisfaction (DeLone & McLean, 2003). In the context of Islamic banking, application system stability has broader strategic implications because it is related to trust, service compliance, and operational sustainability. Previous research on the BSI Mobile and Byond by BSI applications highlighted stability and feature completeness but did not evaluate technical performance quantitatively (Halimah et al., 2025). This study complements that research with empirical evidence based on technical data.

Furthermore, the findings of this study are in line with FinTech literature, which states that digital technology creates new opportunities and risks for bank stability (Xu et al., 2025). However, this study makes a more specific contribution by showing that institutional stability is also determined by the technical performance of modern banking applications. In the context of mobile banking usage, system stability and reliability contribute to the formation of user trust, which has been identified as an important factor in the adoption of digital services (Apau & Lallie, 2022).

Thus, this study emphasizes that evaluating the performance and stability of application systems should be placed on the strategic agenda of Islamic banking technology management. Updates to digital applications such as BION BSI not only impact operational efficiency but also play a role in maintaining customer trust and the sustainability of digital banking services amid increasingly intense industry competition.

CONCLUSIONS

This study analyzes the impact of the BION BSI application update on system performance and stability from the perspective of banking technology management. The results show that the application update provides a significant improvement in key technical performance indicators, namely *response time*, *availability (uptime)*, and a decrease *in error rate*. These findings confirm that the technical performance of the application system is a crucial component in ensuring the reliability of digital banking services, especially in operational environments with high transaction rates.

Theoretically, this study expands the scope of the Information Systems Success Model by emphasizing that the *system quality* dimension not only affects satisfaction and usage intent but also plays a direct role in maintaining operational stability and the sustainability of digital banking services. These findings fill a gap in the mobile banking literature, which has thus far emphasized aspects of technology adoption and user experience, while the technical performance dimension of the system has received relatively little attention in empirical studies.

From an empirical perspective, the use of system log data and technical performance reports as the basis for quantitative analysis provides a significant methodological contribution. This approach results in a more objective evaluation of the impact of application updates compared to previous studies, which were generally based on user perceptions. Thus, this study reinforces the argument that data-driven system performance analysis is a relevant and necessary approach in digital banking studies, particularly in the Indonesian context.

The managerial implications of this study indicate that digital application updates need to be treated as strategic decisions within the framework of IT governance and technology risk management. Banking management, particularly at Bank Syariah Indonesia, needs to make technical performance indicators such as *response time*, *uptime*, and *error rate* part of *the key performance indicators* (KPIs) in evaluating the success of digital transformation. In addition, the application update process must be accompanied by a continuous monitoring mechanism to minimize the risk of service disruption and maintain customer trust.

In the context of Islamic banking, the findings of this study confirm that the stability and reliability of digital application systems are key prerequisites for service continuity and increased stakeholder confidence. Therefore, investment in strengthening technological infrastructure, effective IT governance, and data-driven system performance evaluation are strategic steps that are integral to the development of sustainable Islamic digital banking.

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