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Exploring public sentiment toward Islamic banking apps: A case study of BSI mobile in Indonesia

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Abstract Islamic banking in Indonesia has experienced significant growth since its introduction in the early 1990s, with digital transformation becoming a critical driver of financial inclusion and service accessibility. The establishment of Bank Syariah Indonesia (BSI) in 2021, formed through the merger of several state-owned Islamic banks, marked a pivotal moment in the sector's development. BSI Mobile, as the bank's primary digital platform, serves as a crucial interface for delivering Sharia-compliant financial services to millions of users. However, despite rapid technological advancement, questions remain regarding user satisfaction, trust, and the effectiveness of digital Islamic banking services. This study explores public sentiment toward BSI Mobile by analyzing 25,592 user reviews collected from the Google Play Store using Natural Language Processing (NLP) and Machine Learning techniques. Sentiment classification was conducted based on Ekman's Six Basic Emotions framework, categorizing user feedback into Joy, Surprise, Fear, Sadness, Disgust, and Anger. Two supervised machine learning models—Naïve Bayes and Logistic Regression—were employed to classify reviews into four key aspects: App Performance, Security & Privacy, App Functionality, and User Interaction. Both models demonstrated high accuracy (89.7%) with equivalent performance metrics (AUC: 0.948, F1: 0.898). The findings reveal a highly polarized user experience, with 10,618 one-star ratings and 10,554 five-star ratings, indicating that users have either very positive or very negative experiences. While Joy (11,180 cases) and Surprise (9,943 cases) dominated positive sentiments, Fear (3,072 cases) emerged as a significant concern, primarily related to security and transaction reliability. App Performance and Security & Privacy were identified as the most critical factors influencing user satisfaction. The study provides actionable insights for improving digital Islamic banking services, emphasizing the need for enhanced system stability, robust security measures, and continuous feature optimization. These findings contribute to the broader understanding of digital transformation in Islamic finance and offer practical recommendations for banking institutions, policymakers, and FinTech developers to strengthen user trust and promote wider adoption of Sharia-compliant financial technology solutions.

Keywords: public sentiment, islamic digital banking, BSI mobile, sentiment analysis

1. Introduction

Islamic banking in Indonesia has experienced significant growth since its introduction in the early 1990s. With the increasing public awareness of the importance of a financial system that complies with Islamic principles, numerous Islamic banking institutions have emerged and expanded (Hakimi et al., 2024). The Indonesian government has also provided substantial support to strengthen this sector through various policies aimed at enhancing competitiveness and broadening the reach of Islamic financial services. One of the most significant milestones in the development of Islamic banking in Indonesia was the establishment of Bank Syariah Indonesia (BSI) in 2021, formed through the merger of several state-owned Islamic banks (Pamungkas et al., 2023). As the largest Islamic bank in Indonesia, BSI plays a crucial role in promoting Islamic financial inclusion and enhancing the competitiveness of Islamic banking at both national and global levels (Sari, 2022).

The rapid advancement of financial technology (fintech) has transformed how individuals access financial services (Iqbal et al., 2022). Digitalization has become imperative for financial institutions, including Islamic banks, to enhance operational efficiency, expand service coverage, and provide an improved banking experience for customers (Afif & Samsuri, 2022). One of the primary strategies for adapting to the digital era is the development of mobile banking applications, which enable users to conduct various financial transactions, including fund transfers, bill payments, Islamic investments, and even zakat and waqf contributions, with ease and efficiency (Suhartanto et al., 2019). Given the increasing internet penetration and smartphone

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usage in Indonesia, mobile banking has emerged as a highly effective solution for advancing Islamic financial inclusion (Sari et al., 2024).

To support digital transformation, BSI launched the BSI Mobile application, serving as its primary platform for delivering digital Islamic banking services (Milza et al., 2021). This application is designed to facilitate customer access to a wide range of Sharia-compliant financial services while ensuring that transactions adhere to Islamic principles. By offering features such as online account opening, interbank transfers, zakat payments, and Islamic investment services, BSI Mobile aims to be a comprehensive digital banking solution that enables users to conduct Sharia-compliant financial activities seamlessly (Juwita et al., 2023). However, despite its rapid expansion, the digitalization of Islamic banking still faces several challenges, including user trust in application security, service efficiency, and adherence to Sharia principles in technological implementation (Raymond et al., 2024).

Globally, digital banking has become a dominant trend in the financial industry (Llazo et al., 2024). Factors such as accessibility, operational efficiency, and transaction flexibility have been key drivers of digital banking adoption. However, Islamic banking faces unique challenges in integrating digital technology while maintaining strict adherence to Sharia principles, which prohibit elements of riba (usury), gharar (excessive uncertainty), and maysir (gambling) in financial transactions (Irawan, 2023). As a result, digital transformation in Islamic banking requires not only technological adaptation but also a balance between innovation and Sharia compliance (Aziz et al., 2022; Hamsin et al., 2023). In this regard, oversight from the National Sharia Board (DSN) and the Financial Services Authority (OJK) is crucial to ensuring that digital banking services adhere to established Islamic financial principles (Cherni & Amar, 2024).

As the largest digital banking application within Indonesia's Islamic banking sector, BSI Mobile represents a relevant case study for understanding the effectiveness of Sharia-compliant digital banking services and customer satisfaction levels. With a rapidly growing user base, this application plays a significant role in Indonesia's Islamic digital banking ecosystem (Hilmi, 2021). However, its development also presents several challenges, such as system stability, transaction security, and user satisfaction with the provided services. To gain deeper insights into public perceptions of BSI Mobile, public sentiment analysis emerges as an essential approach in evaluating the effectiveness of this digital service.

Sentiment analysis has been increasingly utilized to assess the success of digital services, including in the banking sector (Lubis, 2024). In the context of Islamic banking, understanding public sentiment towards digital services is crucial for evaluating how well these services meet customer expectations. Previous research has demonstrated that user sentiment plays a key role in determining the success of digital banking applications. However, traditional survey-based methods often have limitations in capturing real-time user experiences. Consequently, this study employs Artificial Intelligence (AI)-driven sentiment analysis and Natural Language Processing (NLP) to examine user reviews of the BSI Mobile application.

The development of Sharia-compliant digital banking applications involves several critical aspects, including data security and transaction integrity, user experience design (UX), and the integration of Sharia-compliant features (Kholidah et al., 2023). Security is paramount in digital banking to ensure that user data remains protected from cyber threats (Zahiroh, 2020). Additionally, ease of access and user-friendly digital services significantly impact customer satisfaction. The integration of Sharia-compliant financial mechanisms is also essential to ensuring that all transactions and services align with Islamic financial principles. Beyond technological aspects, regulatory frameworks established by the Financial Services Authority (OJK) and the National Sharia Board (DSN) play a vital role in ensuring that digital Islamic banking services adhere to both legal and ethical standards.

While extensive research has explored the digitalization of Islamic banking, gaps remain in understanding how public sentiment toward Islamic banking applications influences service adoption and user engagement. Thus, this study aims to address this gap by analyzing public sentiment toward BSI Mobile, providing deeper insights into the factors affecting user satisfaction and the challenges encountered in the digital transformation of Islamic banking. By leveraging AI-driven sentiment analysis and NLP techniques, this study seeks to offer a more comprehensive understanding of how users perceive the BSI Mobile application based on their direct experiences.

This study aims to explore public sentiment toward BSI Mobile by analyzing user reviews from digital platforms. The primary objective is to identify key factors that influence user satisfaction and dissatisfaction, assess the effectiveness and trustworthiness of digital Islamic banking services, and examine how public sentiment toward BSI Mobile reflects broader attitudes toward Islamic banking in the digital era. As BSI Mobile represents the largest Islamic banking application in Indonesia, understanding user perceptions is crucial for improving service quality, system reliability, and customer trust.

To achieve these objectives, this study addresses three key research questions: (1) What factors influence public sentiment toward BSI Mobile? (2) How do users perceive the effectiveness and trustworthiness of digital Islamic banking services? (3) To what extent does sentiment toward BSI Mobile reflect broader public attitudes toward digital Islamic banking? Answering these questions will provide insights into the strengths and weaknesses of BSI Mobile, helping Islamic banking institutions, policymakers, and FinTech developers enhance their services, address user concerns, and promote wider adoption of Sharia-compliant financial solutions.

This research is expected to contribute valuable insights to academics, industry practitioners, and regulators in developing more effective strategies to enhance Islamic digital banking services in Indonesia. By understanding public

sentiment towards digital Islamic banking services, Islamic banks can formulate innovative strategies that better align with customer needs and expectations. Furthermore, the findings of this study can inform regulatory bodies in designing policies that ensure Islamic digital banking services comply with both Islamic financial principles and stringent security standards. Ultimately, this research aims to support the growth of Islamic banking in the digital era and strengthen public trust in Sharia-compliant financial technology solutions.

2. Materials and Methods

This study employs a quantitative research approach using Natural Language Processing (NLP) and Machine Learning (ML) to analyze public sentiment toward BSI Mobile (Feng & Shi, 2019). The methodology consists of five key stages: data collection and preprocessing, sentiment classification, classification analysis, performance evaluation, and tool selection. These stages ensure a structured and systematic approach to sentiment analysis, enabling the extraction of meaningful insights from user-generated reviews. The research methodology workflow is illustrated in Figure 1.

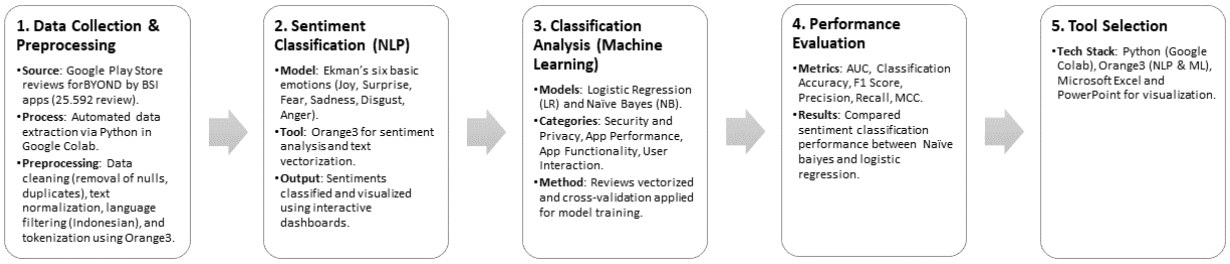

Figure 1 Research methods workflow.

The first stage, data collection and preprocessing, involves extracting user reviews from the Google Play Store for BYOND by BSI Mobile. A total of 25,592 user reviews were collected using an automated data extraction process in Python (Google Colab) to ensure efficiency and scalability. To improve data quality, several preprocessing techniques were applied, including data cleaning (removal of null values, duplicate entries, and irrelevant text), text normalization (conversion of text to lowercase, removal of punctuation, and spelling correction), and language filtering (selection of Indonesian-language reviews to maintain linguistic consistency). Additionally, tokenization was performed to break down text into individual words or phrases for further computational analysis. These preprocessing steps were conducted using Orange3, an open-source data mining tool, which facilitated optimized text representation for sentiment classification. The data processing workflow is depicted in Figure 2.

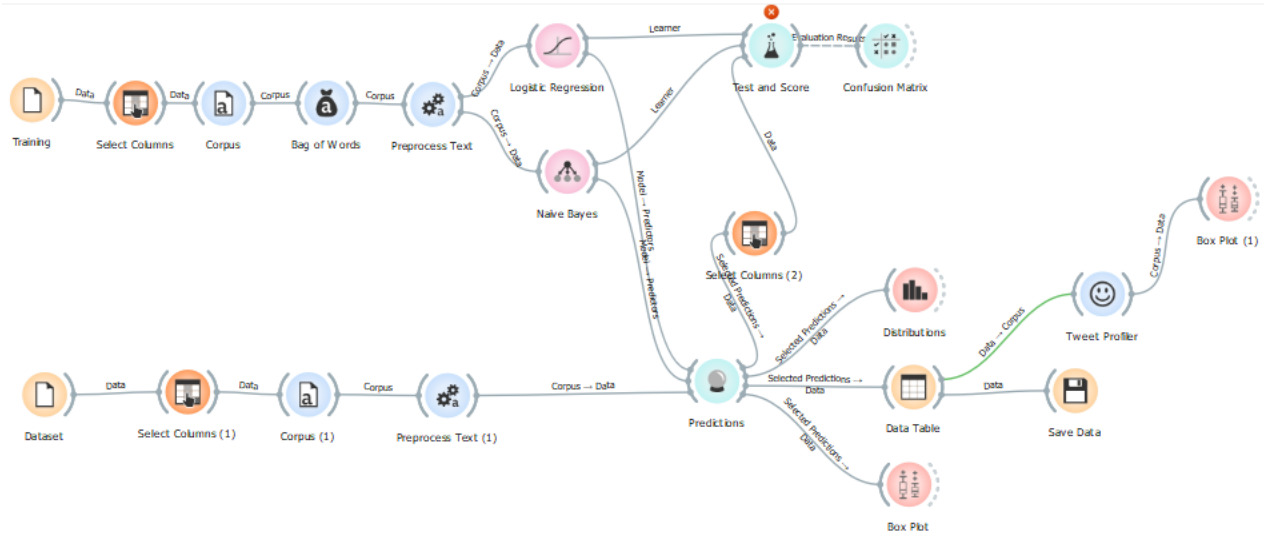

Figure 2 Data processing workflow by Orange3.

In the second stage, sentiment classification, user reviews were analyzed based on Ekman's Six Basic Emotions model, which categorizes sentiment into Joy, Surprise, Fear, Sadness, Disgust, and Anger (Cambria et al., 2013). This classification provides a more detailed emotional understanding of user feedback, rather than a simple positive-negative-neutral categorization. The classification process was performed using Orange3, enabling real-time text analysis, visualization, and interactive dashboard representations of sentiment trends (Sitorus et al., 2024).

The third stage, classification analysis, involves the implementation of two supervised machine learning models to enhance sentiment classification accuracy. Logistic Regression (LR) was chosen for its ability to handle binary and multiclass

classification, while Naïve Bayes (NB) was utilized due to its efficiency in processing large-scale textual data (Aziz et al., 2023; Chen et al., 2019). User reviews were further categorized into four key areas: Security and Privacy, which captures concerns regarding data protection, authentication processes, and fraud prevention; App Performance, which evaluates system stability, loading speed, and technical glitches; App Functionality, which assesses the effectiveness of features, usability, and user interface design; and User Interaction, which reflects customer service responsiveness, transaction experience, and ease of use.

The fourth stage, performance evaluation, was conducted to assess the effectiveness of the sentiment classification models. Several evaluation metrics were employed to measure model accuracy and reliability, including AUC (Area Under the Curve), which determines the classifier's ability to distinguish between sentiment categories; Classification Accuracy (CA), which reflects the overall effectiveness of classification; and F1 Score, which balances Precision and Recall to address the challenge of class imbalance (Jasy et al., 2021). Additional metrics such as Precision (which measures the proportion of correctly predicted positive cases), Recall (which evaluates how well the model identifies actual positives), and Matthews Correlation Coefficient (MCC) (a comprehensive metric that accounts for true positives, true negatives, false positives, and false negatives) were also used (Riyanto et al., 2023). By comparing Naïve Bayes and Logistic Regression, this study identifies the most effective model for classifying BSI Mobile user sentiment.

The final stage, tool selection, involved utilizing various software and programming tools to facilitate data processing, analysis, and visualization. Python (Google Colab) was used for data extraction, preprocessing, and machine learning implementation, while Orange3 was leveraged for NLP-based sentiment classification and interactive visualizations. Additionally, Microsoft Excel and PowerPoint were employed for organizing data outputs and presenting research findings in a structured format.

By employing a data-driven, NLP-based sentiment analysis, this study provides a comprehensive assessment of public sentiment toward BSI Mobile. The insights derived from this research will enable financial institutions to enhance user experience, address customer concerns, and optimize Islamic digital banking services, contributing to the overall improvement and acceptance of Sharia-compliant financial technology.

3. Results

This study aims to understand public sentiment toward BSI Mobile, a digital Islamic banking application, by analyzing user reviews using Natural Language Processing (NLP) and Machine Learning (ML). The analysis covers sentiment distribution, application ratings, classification of reviews based on key aspects, comparison of ratings with aspects, and evaluation of sentiment classification models.

3.1. Sentiment Distribution in User Reviews

Sentiment distribution analysis reveals significant variations in user emotions toward BSI Mobile. Sentiment classification based on Ekman's Six Basic Emotions categorizes user sentiment into six primary categories: Joy, Surprise, Fear, Sadness, Disgust, and Anger. The distribution of user sentiments is presented in Figure 3.

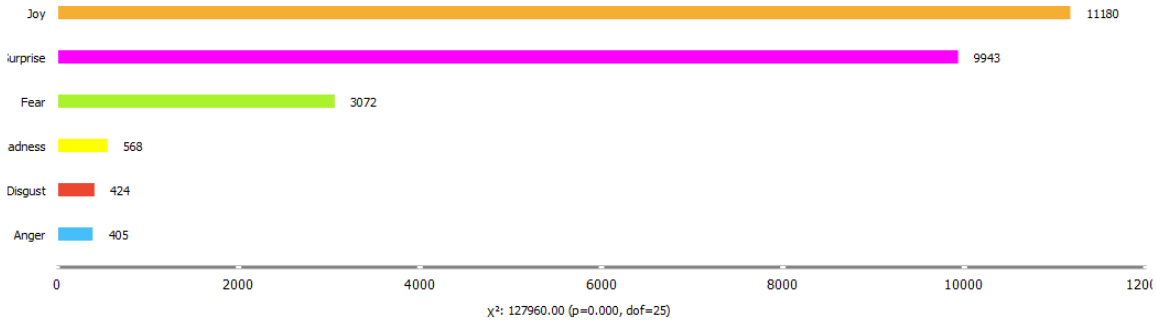

Figure 3 Figure Sentiment Distribution result.

The results indicate that most user sentiments are positive, with Joy (11,180 cases) and Surprise (9,943 cases) as the dominant categories. Joy sentiment suggests that most users are satisfied with their experience using BSI Mobile, particularly in terms of transaction convenience, comprehensive Islamic banking features, and a user-friendly interface. Additionally, Surprise sentiment indicates that some users experienced positive surprises, likely due to feature enhancements, system improvements, or better-than-expected service experiences.

However, negative sentiments are also present in significant numbers, highlighting challenges in application management. Fear (3,072 cases) reflects concerns regarding data security and transaction failure risks, which are critical issues in digital banking services. Sadness (568 cases), Disgust (424 cases), and Anger (405 cases) indicate specific dissatisfaction, such as application bugs, slow customer service, or non-functional features.

Statistical analysis using chi-square (χ^2 = 127960.00, p=0.000, dof=25) confirms that sentiment distribution is statistically significant, indicating structured sentiment patterns in user reviews rather than random occurrences. Although most users have a positive experience, technical and customer service improvements are necessary to reduce negative sentiment.

3.2. Overall Application Rating Analysis

In addition to sentiment analysis, this study evaluates the distribution of application ratings given by users. User ratings reflect their level of satisfaction or dissatisfaction with BSI Mobile's services. The polarization of application ratings is shown in Figure 4.

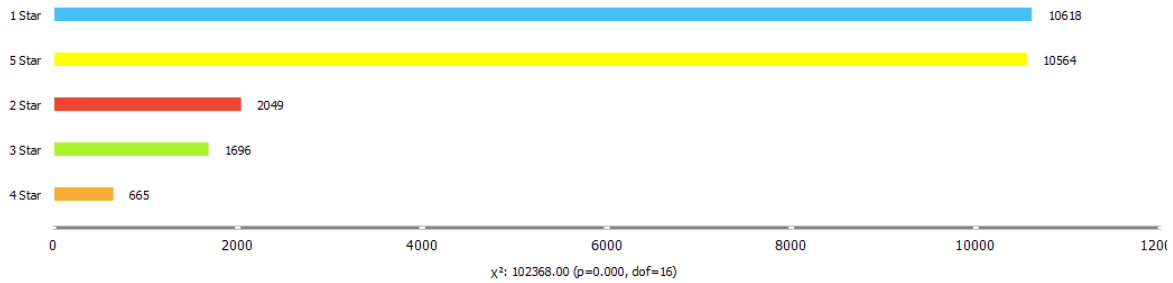

Figure 4 Rating apps result.

The findings show that user ratings for BSI Mobile are highly polarized, with 1-star ratings (10,618 cases) and 5-star ratings (10,554 cases) as the dominant categories. This pattern suggests that most users have either very positive or very negative experiences, with few users falling into neutral categories.

Users who gave 1-star ratings commonly reported technical issues, such as frequent application crashes, failed transactions, or unresponsive customer service. In contrast, users who gave 5-star ratings highlighted ease of use, comprehensive Islamic banking features, and service improvements implemented by BSI Mobile.

Meanwhile, 2-star (2,049 cases), 3-star (1,696 cases), and 4-star (665 cases) ratings have much lower distributions, indicating that most users have strong opinions, either highly satisfied or highly dissatisfied.

The chi-square test (χ^2 = 102368.00, p=0.000, dof=16) confirms that the rating distribution is statistically significant, meaning a clear relationship exists between user experience and the ratings they provide. Thus, to improve overall application ratings, enhancing application performance and customer service is the most strategic approach.

3.3. Sentiment Classification Results in User Reviews

To understand the main factors influencing user experience, reviews were classified into four primary categories: App Performance, Security & Privacy, App Functionality, and User Interaction. The classification results using two Machine Learning models, Naïve Bayes (NB) and Logistic Regression (LR), show that most user reviews focus on App Performance and Security & Privacy, indicating that application stability and transaction security are the main factors in user experience. The aspect classification results from the Naïve Bayes model are displayed in Figure 5. The corresponding results from the Logistic Regression model are provided in Figure 6.

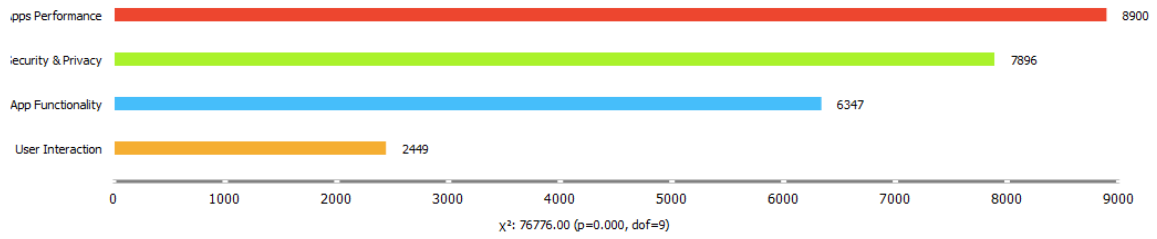

Figure 5 Naive Bayes Classification Results.

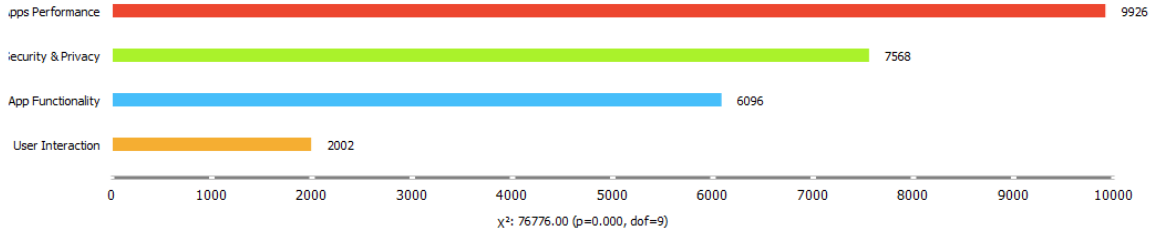

Figure 6 Logistic Regression Classification Results.

From these results, it is evident that App Performance and Security & Privacy have the highest number of reviews, meaning that technical issues and security are primary factors influencing user satisfaction or dissatisfaction. Conversely, User Interaction has the fewest reviews, indicating that customer interaction is not a major focus in user feedback, though it still plays a role in overall user experience enhancement.

3.4. Comparative Analysis Between App Ratings and Aspect Classification

The analysis further examines the relationship between app ratings and classified review aspects. Findings reveal that 1-star ratings are strongly associated with App Performance and Security & Privacy, indicating that users who are dissatisfied primarily complain about technical and security issues. The relationship between app ratings and aspects via the Logistic Regression model is analyzed in Figure 7. A comparative analysis using the Naïve Bayes model is presented in Figure 8.

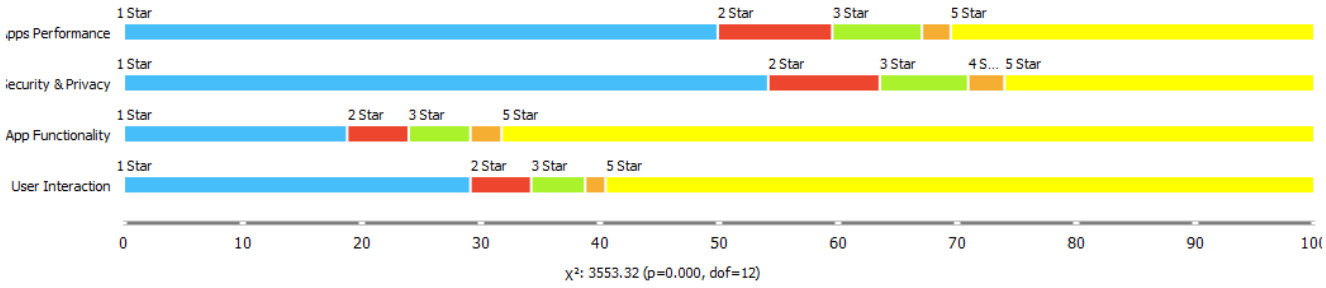

Figure 7 App Ratings and Aspect Classification by Logistic Regression Model.

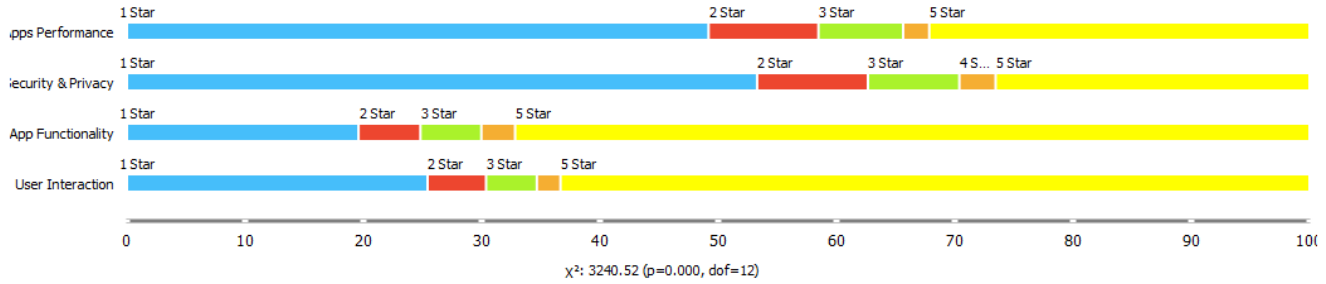

Figure 8 App Ratings and Aspect Classification by Naïve Baiyes Model.

Conversely, 5-star ratings are more linked to App Functionality and User Interaction, suggesting that users who are satisfied tend to emphasize application features and their overall interaction experience. The distribution of mid-range ratings (2-star to 4-star) is relatively small, reinforcing the finding that BSI Mobile users tend to have either a very good or very bad experience, with few in-between cases. The chi-square test (χ^2 = 3553.32 for NB, χ^2 = 3240.52 for LR, p=0.000, dof=12) confirms that the relationship between ratings and aspect classification is statistically significant, indicating that the observed patterns have real implications for application improvement strategies.

3.5. Performance Evaluation of Sentiment Classification Models

The performance of Naïve Bayes (NB) and Logistic Regression (LR) models was compared using various evaluation metrics. The performance metrics of the classification models are compared in Table 1.

Table 1 Model performance.

Model	AUC	CA	F1	Precision	Recall	MCC
Logistic Regression	0.948	0.897	0.898	0.903	0.897	0.856
Naïve Bayes	0.948	0.897	0.898	0.903	0.897	0.856

The results indicate that both models have equivalent performance, with an accuracy of 89.7% and an AUC of 0.948, meaning both models can classify user sentiment with high accuracy. Thus, Naïve Bayes and Logistic Regression can be used interchangeably in practical implementations to analyze user sentiment toward digital banking applications.

4. Discussion

4.1. Analysis of Emotion-Based Sentiment Distribution

The findings of sentiment distribution in BSI Mobile user reviews highlight significant emotional variations, with Joy (11,180 cases) and Surprise (9,943 cases) as the most dominant emotions. These positive emotions suggest that many users

appreciate BSI Mobile's ease of use, accessibility, and features tailored to Islamic financial services (Samudera et al., 2024). The Joy sentiment likely stems from seamless transactions, efficient fund transfers, and integration of Sharia-compliant financial services such as zakat and investment options. Similarly, Surprise suggests that users found features or service improvements exceeding their expectations, indicating positive developments in the app's functionality (Alfani et al., 2023).

However, a considerable number of negative sentiments were recorded, with Fear (3,072 cases), Sadness (568 cases), Disgust (424 cases), and Anger (405 cases). Fear primarily arises from concerns over transaction security, data privacy, and the potential risk of failed transactions, which are particularly critical in Islamic digital banking due to the importance of trust (amanah) and transaction integrity (Kishnani et al., 2022). Sentiments of Sadness, Disgust, and Anger are often linked to technical failures such as app crashes, slow response times, and poor customer service interactions. These findings suggest that, while positive sentiments dominate, users' concerns regarding security and app stability require further attention.

Statistical analysis using the chi-square test (χ^2 = 127960.00, p=0.000) confirms that these sentiment variations are statistically significant, indicating structured patterns rather than random occurrences. This implies that enhancing security features and app reliability should be prioritized to mitigate negative user experiences and strengthen trust in digital Islamic banking.

4.2. Polarization of User Ratings and Experience

A key finding in this study is the highly polarized distribution of user ratings, with 10,618 cases of 1-star ratings and 10,554 cases of 5-star ratings. This stark contrast suggests that BSI Mobile users generally have either very positive or very negative experiences, with minimal neutral perspectives.

This polarization pattern aligns with the Expectancy Disconfirmation Theory (EDT), which posits that user satisfaction results from the comparison between expected and perceived performance (Schiebler et al., 2025). When digital banking services exceed expectations, users express high satisfaction; conversely, significant performance gaps lead to dissatisfaction (Amin et al., 2013).

Users who gave 1-star ratings frequently reported technical malfunctions, failed transactions, and poor customer service responsiveness. These issues correlate strongly with App Performance and Security & Privacy concerns, reinforcing the sentiment classification results. Meanwhile, users providing 5-star ratings often praised the app's convenience and improved features, consistent with Technology Acceptance Model (TAM) principles where perceived usefulness and ease of use drive adoption (Davis, 1989).

4.3. Model Performance and Methodological Implications

The comparative evaluation of Naïve Bayes and Logistic Regression models demonstrates that both models yield identical classification performance (AUC: 0.948, CA: 0.897, F1: 0.898, Precision: 0.903, Recall: 0.897, MCC: 0.856). These findings indicate that either model can effectively classify sentiment in Islamic banking applications, making them suitable for real-time sentiment monitoring (Setiawan et al., 2023).

The high classification accuracy (89.7%) suggests that automated sentiment analysis can be a reliable tool for tracking user perceptions. Compared to traditional survey-based methods, NLP-based sentiment analysis provides real-time insights into user concerns and experiences, making it a more dynamic and scalable approach for Islamic banking research. Additionally, the integration of Ekman’s Six Basic Emotions framework enhances sentiment classification accuracy by offering a more nuanced understanding of user emotions.

4.4. Technological Challenges in Islamic Digital Banking

The sentiment analysis results reveal significant technological challenges facing BSI Mobile that directly impact user trust and adoption. System stability issues emerged as a critical concern, with the high number of 1-star ratings (10,618 cases) predominantly associated with App Performance problems. These technical challenges manifest as application crashes, transaction failures, and system downtimes that fundamentally undermine user confidence.

From a Service Quality Theory perspective, particularly the SERVQUAL framework adapted for e-banking (Zeithaml et al., 2002), technical failures represent critical gaps in service delivery. (Pikkarainen et al., 2004) emphasize that perceived security and system reliability are fundamental determinants of online banking acceptance. In the Islamic banking context, Amin (2013) argues that technical performance is intrinsically linked to the concept of amanah (trustworthiness), where system failures violate both technological and religious expectations.

The substantial presence of Fear sentiment (3,072 cases) indicates widespread security concerns relating to data protection and transaction integrity. This aligns with Protection Motivation Theory (Rogers, 1975), which suggests that perceived vulnerability and severity of threats influence technology adoption behaviors. (Bashir & Madhavaiah, 2015) found that security concerns significantly impede mobile banking adoption, particularly in emerging markets where trust in digital infrastructure remains fragile.

4.5. Strategic Recommendations for Digital Islamic Banking

Based on the sentiment analysis findings, BSI Mobile requires a comprehensive improvement strategy focused on four key areas. First, performance optimization must address the fundamental technical issues driving negative sentiment. This requires strengthening backend infrastructure, improving database management systems, and implementing more rigorous application testing protocols to reduce crashes and transaction failures that currently constitute a significant source of user frustration (Yudhistira & Talita, 2024).

Second, security enhancements must target the Fear sentiment evident in 3,072 cases. This necessitates implementing advanced fraud detection systems, multi-factor authentication, and real-time transaction monitoring that align with Islamic principles of financial protection. Enhanced transparency around security measures could also help address user concerns, as fear of financial loss appears to be a significant barrier to full adoption of digital Islamic banking services (Khan et al., 2023).

Third, feature development strategies should prioritize functionality improvements in areas showing positive sentiment correlation. The analysis reveals that App Functionality aspects generate more 5-star ratings, suggesting that users value Sharia-compliant features when they work reliably. BSI should enhance zakat calculation tools, Islamic investment platforms, and waqf contribution systems while ensuring these distinctly Islamic features maintain technical excellence (Laldin & Furqani, 2019; Tripalupi et al., 2021).

Fourth, customer education initiatives must be implemented to increase awareness and build confidence in Islamic digital banking. The sentiment analysis indicates knowledge gaps regarding Islamic finance principles in digital contexts, suggesting that educational content explaining both the technical and Sharia compliance aspects of BSI Mobile could significantly improve user perception and adoption rates (Adrutdin et al., 2020).

4.6. Regulatory and Governance Framework

The sentiment analysis findings have substantial implications for regulatory frameworks governing Islamic digital banking in Indonesia. The significant presence of security concerns and technical failures highlights the need for stronger oversight from both the Financial Services Authority (OJK) and the National Sharia Board (DSN).

Institutional Theory provides a theoretical lens for understanding these regulatory challenges. In Islamic fintech, these pressures manifest through Sharia compliance requirements alongside conventional regulatory standards (Shaikh & Karjaluoto, 2015). (Hassan et al., 2020) emphasize that Islamic financial institutions must balance innovation with adherence to Sharia principles, requiring robust governance frameworks.

The polarized user sentiment distribution demonstrates challenges in balancing rapid digital innovation with regulatory compliance. As evident from the statistical significance of sentiment patterns (χ^2 = 127960.00, p=0.000), user concerns represent systematic issues requiring regulatory attention. (Ozili, 2018) argues that fintech regulation must address consumer protection, operational resilience, and systemic risk—concerns magnified in Islamic banking where religious compliance adds complexity. The sentiment analysis methodology offers regulatory bodies a new monitoring approach. By adopting AI-driven techniques, regulators could implement continuous monitoring systems.

4.7. Broader Implications for Islamic Financial Inclusion

BSI Mobile represents a crucial element in Indonesia's strategy to expand Islamic financial inclusion. The sentiment analysis provides valuable insights into how digital platforms can either accelerate or hinder this goal. The predominance of Joy (11,180 cases) and Surprise (9,943 cases) sentiments indicates that when functioning optimally, digital Islamic banking services generate significant positive experiences, potentially driving wider adoption of Sharia-compliant financial services among previously underserved populations.

The sentiment trends identified in this study can serve as baseline metrics for tracking Indonesia's progress in Islamic banking digitalization (Zouari & Abdelhedi, 2021). By monitoring sentiment evolution over time, stakeholders can assess whether improvement initiatives are effectively addressing user concerns and enhancing the overall experience. This longitudinal approach to sentiment analysis would provide deeper insights into the effectiveness of digital transformation strategies within Islamic banking.

When comparing these findings with digital banking sentiment studies from other markets, BSI Mobile faces similar technical challenges but with the added complexity of maintaining strict Sharia compliance (Dawood et al., 2022). This creates both constraints and opportunities for innovation. The sentiment analysis methodology employed in this study contributes to Indonesia's potential leadership in Islamic finance by providing empirically-grounded approaches to understanding user perception and behavior in digital Islamic banking contexts.

The integration of sentiment analysis into strategic planning processes offers BSI and other Islamic banks a powerful tool for aligning digital development with user expectations. By systematically addressing the concerns identified through sentiment analysis while enhancing the features that generate positive sentiment, Islamic banking providers can strengthen their digital platforms and expand their reach, ultimately contributing to greater financial inclusion across Indonesia's diverse population.

5. Conclusions

This study provides a comprehensive analysis of public sentiment toward BSI Mobile, shedding light on the primary factors influencing user experiences and perceptions of Islamic digital banking services. The findings indicate that while users generally express satisfaction with the app's functionality and Sharia-compliant features, significant concerns regarding security and app stability persist. Addressing these issues is crucial for increasing user trust and improving overall adoption rates. Technical enhancements, particularly related to transaction security and system reliability, should be prioritized to reduce the fear and frustration expressed by users.

Moreover, the study underscores the significance of app performance in shaping public sentiment. Users who experience seamless transactions and functional features tend to report higher satisfaction levels. On the other hand, users dissatisfied with the app's performance or customer service tend to provide lower ratings, highlighting the need for continuous improvements in technical support and system efficiency. Understanding and addressing these user concerns can significantly enhance customer retention and contribute to the sustainable growth of BSI Mobile.

In conclusion, this research suggests that BSI Mobile and other digital Islamic banking applications must focus on optimizing their technical performance and ensuring robust security protocols to strengthen public trust. By leveraging the insights gained from sentiment analysis, BSI can refine its user experience, address critical pain points, and ultimately support the growth of Islamic financial inclusion in Indonesia. Additionally, regulatory bodies should play an active role in setting standards for both Sharia compliance and digital banking security to safeguard the interests of consumers and promote the integrity of the sector.

Ethical considerations

Not applicable.

Conflict of interest

The authors declare that they have no conflicts of interest.

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