APTISI Transactions on Technopreneurship (ATT)
Vol. 8, No. 1, March 2026, pp. 253−267
E-ISSN: 2656-8888 | P-ISSN: 2655-8807, DOI:10.34306

Analyzing Public Sentiment on Digital Banks in Indonesia via Social Media X

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Article Info

Article history:

Submission November 06, 2024
Revised March April 29, 2025
Accepted December 20, 2025
Published January 23, 2026

Keywords:

Public Sentiment
Digital Banks
Social Media X
Sentiment Analysis
Financial Technology

ABSTRACT

This study aims to analyze public sentiment towards digital banks in Indonesia, specifically Bank Jago, using data from social media Twitter. Sentiment analysis methods were used to classify tweets into positive, negative and neutral categories. **The findings** show that public perceptions are generally positive, with a focus on technological innovation and ease of service. However, key complaints related to technical issues and customer service remain noteworthy. Most tweets had neutral to positive sentiments, reflecting a favorable public view of digital banks. **These results** highlight the importance for digital banks to continuously improve the customer service and technical stability of their apps to maintain a good reputation in the eyes of the public. **In addition**, the positive sentiments that arise regarding technological innovation can be leveraged to reinforce the bank's image as a modern and efficient institution. Recommendations from this study include developing a more responsive customer support system and improving app stability. **With these measures**, digital banks can maintain public trust and compete in an increasingly competitive market, as well as increase customer satisfaction and loyalty. This research provides valuable insights for digital bank business strategy in Indonesia.

DOI: http://doi.org/10.34306/att.v8i1.530

1. INTRODUCTION

The development of digital banks in Indonesia has significantly changed the face of the financial sector [1, 2]. By relying on advanced technology, digital banks offer faster, easier, and more efficient banking services without the need for physical branches [3]. This makes it easier for customers to conduct financial transactions anytime and anywhere through digital devices [4]. This transformation has also improved the way banks interact with customers, enhancing user experience through apps and online services [5–7]. However, along with this rapid development, public perception of digital banks has become increasingly important [8]. Users experiences of using digital bank services and how they talk about them on social media platforms play a role in shaping a company's image and reputation [9].

In an increasingly digitally connected world, public sentiment towards digital banks has a huge impact on customer trust and loyalty [10–12]. How people view and rate digital bank services can influence their decision to stay with or switch to other services [13, 14]. Therefore, understanding public perception through

sentiment analysis is crucial for digital banks in maintaining and improving reputation and customer trust [15, 16]. With sentiment analysis, companies can gain insight into how the public perceives their services [17, 18], as well as what factors influence the level of customer satisfaction or dissatisfaction [19, 20].

Despite the growing popularity and use of digital banks [21], there is still limited understanding of how public sentiment towards these banks can affect corporate reputation and customer trust [22, 23]. Many digital banks may not have fully realized the importance of identifying and responding to negative sentiment spread on social media platforms [24, 25]. This lack of insight may pose a risk to long-term reputation, given that negative opinions can spread quickly in the digital world [9, 26, 27]. Therefore, this study focuses on how public sentiment, expressed through social media such as Twitter, can influence perceptions of digital banks in Indonesia [28, 29].

The main objective of this research is to analyze public sentiment towards digital banks in Indonesia using data from social media, particularly Twitter [10, 30]. This research will identify trends, patterns, and relationships between public sentiment and factors that influence customer satisfaction or dissatisfaction with digital bank services [5, 31]. In addition, this research aims to provide a deeper understanding of how banks can use these sentiment analysis results to improve customer service, reputation and trust [3, 25].

This research is expected to contribute significantly to the understanding of public perceptions of digital banks in Indonesia [13, 32, 33]. By providing new insights into how the public assesses digital bank services through sentiment analysis on social media, banks can use this information to develop better business strategies [34**?** , 35]. The results of this research can also help digital banks prioritize service improvements that are most important to customers [36, 37], thereby increasing consumer satisfaction and trust [10, 38]. Overall, this research will provide guidance for digital banks in shaping a positive image in the eyes of the public through better perception and sentiment management [39, 40].

2. RESEARCH METHOD

2.1. Research Design

This research used an exploratory study approach that aims to analyze public sentiment towards digital banks in Indonesia [41]. In this study, content analysis was used to assess sentiments expressed through various social media platforms, such as Twitter, as well as online news and discussion forums [42, 43]. This exploratory approach was chosen as it allows researchers to explore broad public perceptions and identify patterns and trends that may not have been noticed before [44].

2.2. Data Collection

The data for this study was collected from social media platforms, the main data source for social media is X, where public opinions and sentiments about digital banks in Indonesia, particularly Bank Jago, are widely expressed. For data collection in X, a Python crawling technique using the Tweepy library was used to extract tweets related to specific keywords covering Bank Jago and other digital banks in Indonesia [45, 46]. The data collected includes tweet text, date, time, number of retweets, number of likes, and initial sentiment [46, 47]. In addition, data from online news articles was obtained using web scraping techniques performed through automated tools to retrieve news related to digital banks in Indonesia [46, 48].

2.3. Sentiment Analysis Techniques

The sentiment analysis technique used in this research involves a machine learning approach, where tweets and news articles are classified into positive, negative, or neutral sentiment categories [49, 50]. Some of the machine learning algorithms used in this research include Naive Bayes, Support Vector Machine (SVM), and Neural Networks [51, 52].

Before conducting sentiment analysis, several data pre-processing steps are performed to ensure that the data is ready for analysis. The text preprocessing stage in this study consists of several main steps, namely tokenization, stemming, and stopword removal. Tokenization is performed to break the text into smaller units, such as words or phrases, making it easier to analyze. Stemming is then applied to transform words into their root forms in order to standardize different word variations with similar meanings. In addition, stopword removal is carried out to eliminate common words that do not contribute significantly to sentiment analysis, such as “and”, “which”, and “in”. To further improve the accuracy of the analysis, a data cleaning process is also conducted by removing emojis, punctuation marks, and unnecessary symbols.

2.4. Data Analysis

Once the pre-processing is complete and the data is classified based on sentiment, the next step is data analysis to identify sentiment trends and emerging patterns. This analysis includes:

- Identify sentiment trends: Observe how public sentiment towards a digital bank changes over time, e.g. whether there is an increase or decrease in positive or negative sentiment in a given period.
- Temporal pattern analysis: Tracking changes in sentiment over a period of time, such as changes in sentiment during a new product announcement or after a specific incident.
- Identify key themes: Explore themes that emerge from public discussions on social media and online news, such as customer complaints, praise for services, or concerns about security.

The results of this analysis are expected to provide deeper insights into public perceptions of digital banks in Indonesia, which can be used by banks to develop strategies to improve reputation and customer satisfaction.

3. RESULT

3.1. Data Collection and Data Categorization

Total data collected a total of 708 tweets mentioning the name of the digital bank Bank Jago were collected from the period June 2022 to August 2024. Data Source from social media platform X. The sentiment category used in the analysis. includes positive, negative, and neutral sentiment, seen in Table 1.

Table 1. Distribusi Sentimen Bank Jago

Sentiment	Count
Neutral	588
Positive	120
Negative	48

Based on Figure 1 the sentiment analysis that has been conducted, most of the tweets have Neutral sentiment (588 tweets or 77.8%), There are 120 tweets (15.9%) with Positive sentiment The remaining 48 tweets (6.3%) have Negative sentiment. The majority of tweets about Bank Jago tend to be neutral, which may indicate that many users are simply relaying information or their experiences without strong emotions. There are more positive tweets than negative, which could indicate that in general, perceptions of Bank Jago tend to be more positive. The relatively small number of negative tweets could be an indication that there is no major issue that is generating widespread negative sentiment towards Bank Jago.

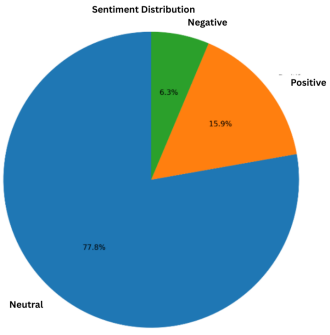

Figure 1. Visualization of Sentiment Distribution

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Based on Figure 2 the analysis conducted, will present a summary of the data categories by demographics (geographic location) and category (consumer vs. financial analyst).

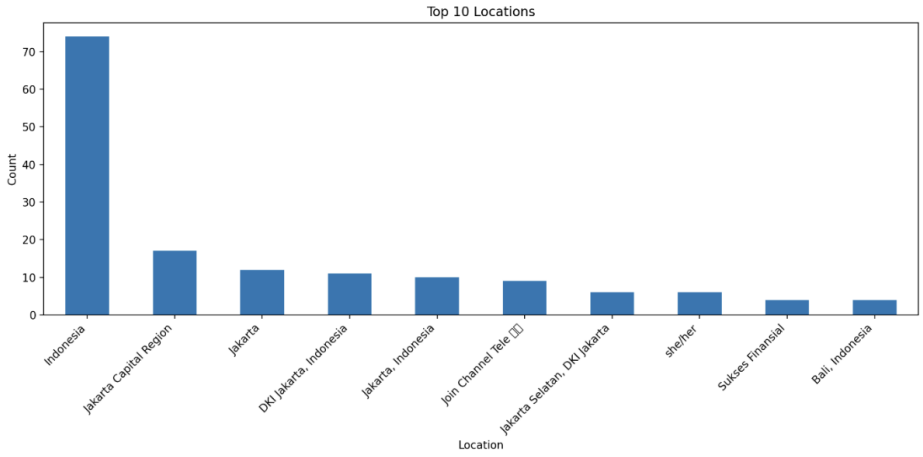

Figure 2. Geographic Location Analysis

Based on Figure 3 show in top 5 locations by number of tweet from Indonesia (74 tweets), Jakarta Capital Region (17 tweets), Jakarta (12 tweets), DKI Jakarta, Indonesia (11 tweets), Jakarta, Indonesia (10 tweets). The majority of tweets came from Indonesia, particularly the Jakarta area. Many users did not include a specific location, just ”Indonesia”. There were some variations in the way users mentioned Jakarta (e.g. ”Jakarta”, ”Jakarta Capital Region”, ”DKI Jakarta, Indonesia”).

Figure 3. Geographic Location Analysis

In general, neutral sentiment dominates in all top 5 locations. Jakarta Capital Region has a higher proportion of positive sentiment than other locations. DKI Jakarta, Indonesia has a slightly higher proportion of negative sentiment than other locations.

Based on keywords related to financial analysis, tweets were classified into those originating from financial analysts and those from general consumers. The results show in Figure 4, only 19 tweets reflected

perspectives associated with financial analysts, while the majority, amounting to 737 tweets, were posted by consumers. This indicates that discussions about digital banks on social media are predominantly driven by consumer experiences rather than professional financial analysis, highlighting the strong influence of user perceptions in shaping public sentiment toward digital banking services.

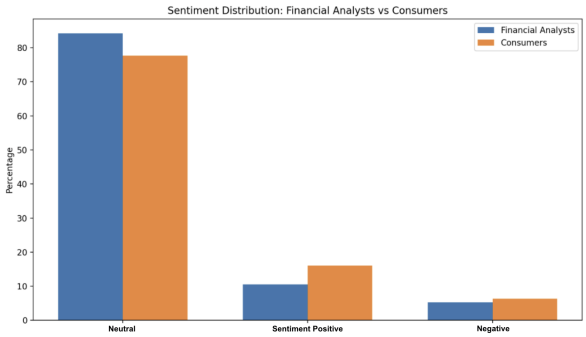

Figure 4. Category Analysis (Consumer vs. Financial Analyst)

The majority of tweets (97.5%) were from general consumers, not financial analysts. Financial analysts have a higher proportion of neutral sentiments than general consumers. General consumers have a slightly higher proportion of positive and negative sentiments than financial analysts. Conclusion on this category of analysis, Location The majority of users talking about Bank Jago are from Indonesia, especially the Jakarta area. This suggests that Bank Jago may have strong market penetration in the region. While neutral sentiment dominates across all locations, there is a slight variation in the proportion of positive and negative sentiment. This could be an indication of different experiences or perceptions towards Bank Jago in different locations. There were very few tweets from financial analysts compared to general consumers. This suggests that most conversations about Bank Jago on social media are dominated by consumer experiences and opinions, rather than professional analysis. Financial analysts tend to be more neutral in their comments, while general consumers have a greater variety of sentiments. This may reflect differences in how these two groups perceive and interact with Jago Bank.

3.2. Sentiment Analysis Results

Based on Figure 5, the data analysis conducted, here is a brief summary of the key findings regarding public sentiment towards Bank Jago during the time period under review:

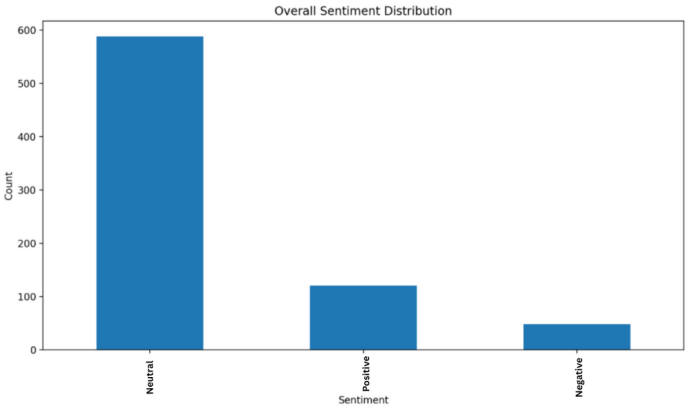

Figure 5. Overall Sentiment Distribution

The sentiment distribution shows that neutral sentiment dominated the dataset with 588 tweets (77.8%), followed by positive sentiment with 120 tweets (15.9%), while negative sentiment accounted for only 48 tweets

(6.3%). This indicates that public discussions about the digital bank were largely neutral in tone, with a stronger tendency toward positive perceptions than negative ones.

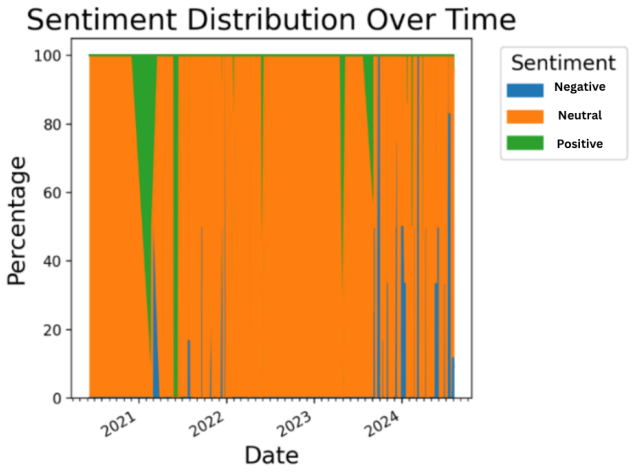

Figure 6. Sentiment Change over Time

Based on Figure 6 the corrected chart, we can see the changes in sentiment towards Bank Jago over time more clearly. The data covers the period from June 11, 2020 to August 2, 2024. The total observation period spans 1,514 days. Neutral sentiment represented by the blue color consistently dominates throughout the period, which aligns with the findings of the previous analysis. Positive sentiment shown in green is generally higher than negative sentiment shown in red. The sentiment distribution exhibits notable fluctuations over time, with several prominent peaks observed in both positive and negative sentiments at certain periods. Overall, no clear seasonal pattern can be identified in the sentiment changes. In early 2021, there is a marked increase in positive sentiment, while the period from mid-2021 to early 2022 shows greater volatility in sentiment dynamics. During 2022 to 2023, sentiment appears more stable with neutral sentiment remaining dominant. In 2024, although the data are still limited, noticeable variations in sentiment are evident. Several peaks in positive and negative sentiment suggest the presence of specific events or issues that may have significantly influenced public perception.

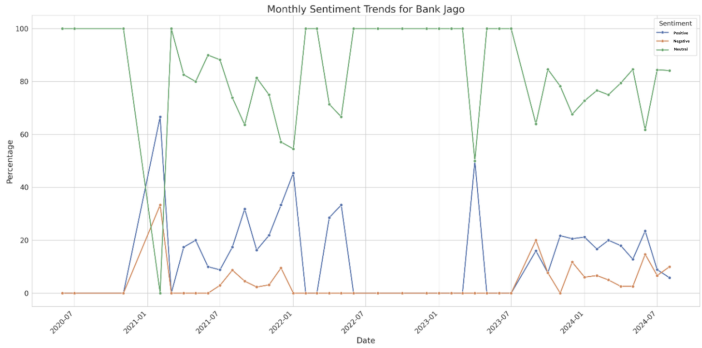

Figure 7. Monthly charts and visualizations

Based on Figure 7, the graphs and data generated, here is the temporal sentiment trend analysis for Bank Jago: The data covers the period from June 2020 to August 2024. A total of 42 months of data were analyzed. Neutral Sentiment (blue line) consistently dominates throughout the period, with a monthly average of 82.09%. Positive Sentiment (green line) was generally higher than Negative Sentiment (red line). The monthly average for Positive Sentiment is 14.14%, while Negative Sentiment is only 3.77%. There are significant fluctuations in the sentiment distribution from month to month, especially for Positive and Negative Sentiment. Neutral Sentiment tends to be more stable, but still shows some sharp drops at some points. February 2021 is

the most interesting month, as it is the month with the highest Positive Sentiment and also the highest Negative Sentiment. This indicates a strong polarization of opinion in the month. There was an increase in sentiment volatility from mid-2021 to early 2022. There is a trend of decreasing Neutral Sentiment and increasing Positive Sentiment seen at some point throughout 2022-2023. There is no clear seasonal pattern in sentiment changes, but there are some interesting patterns. Positive Sentiment tends to have a few prominent peaks each year. Negative Sentiment, while low, shows some significant short spikes. Towards the end of the period 2024, there is an increase in Positive Sentiment and a decrease in Neutral Sentiment, which may indicate increased positive engagement from users.

The identify specific events that might affect public sentiment. For example, the launch of a new product by the bank, negative news about the bank's policies, or a change in management.

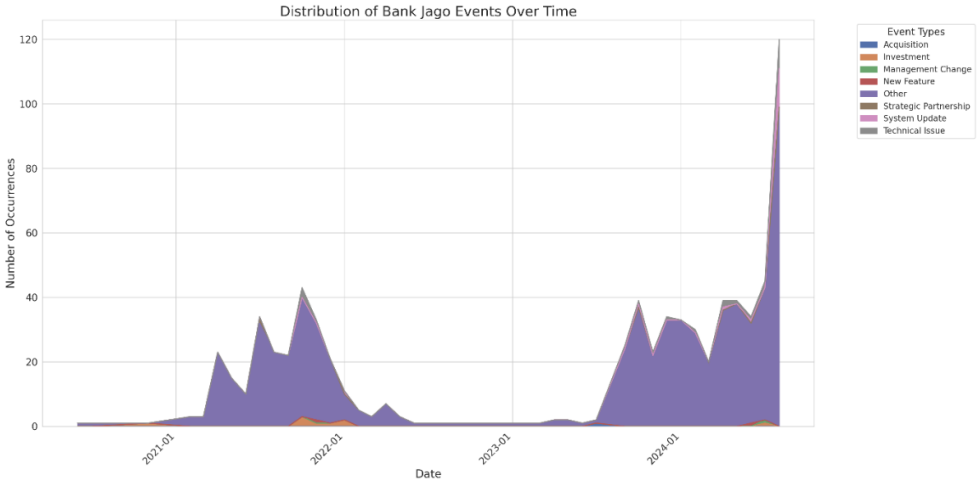

Figure 8. Event Distribution

Based on Figure 8 the graphs and data generated, the following is an analysis of the correlation between specific events and public sentiment towards Bank Jago: The graph shows the distribution of different types of events related to Bank Jago from June 2020 to August 2024. It can be seen that the "Other" category dominates most areas of the graph, indicating that many tweets do not specifically refer to the key events we defined. There is a significant increase in the number of events towards the end of the period 2024, especially in July and August 2024. There are some noticeable peaks in activity, for example in October 2021 and October 2023.

Table 2. Event Type

Events	**Value**
More	701
Technical Issues	24
System Updates	16
Investment	9
Strategic Cooperation	3
New Features	2
Acquisition	1
Management Change	1

As shown in Table 2, the event category labeled "Other" dominated the dataset with a total of 701 occurrences. Among the specific event types, "Technical Issues" recorded the highest frequency with 24 occurrences, followed by "System Updates" with 16 occurrences and "Investment" with 9 occurrences. In contrast, categories such as "Strategic Cooperation," "New Features," "Acquisition," and "Management Change" appeared far less frequently, indicating that these events were relatively rare compared to the dominant and technical-related categories.

Table 3. Month with Highest Activity

Year_Month	0
2024-08-01	120
2024-07-01	45
2021-10-01	43
2023-10-01	39
2024-04-01	39

As presented in Table 3, August 2024 recorded the highest number of events with a total of 120 occurrences, followed by July 2024 with 45 events. Other periods with relatively high activity include October 2021 (43 events), October 2023 (39 events), and April 2024 (39 events), indicating notable fluctuations in event intensity over time. The concentration of events in July and August 2024 may suggest the presence of major campaigns, system changes, or significant organizational activities within Bank Jago during this period.

Furthermore, these temporal patterns provide important context for understanding sentiment dynamics, as spikes in event frequency often coincide with shifts in public perception. Peaks observed in October 2021 and October 2023 may also reflect recurring annual events or seasonal trends that influence user engagement and sentiment toward the bank.

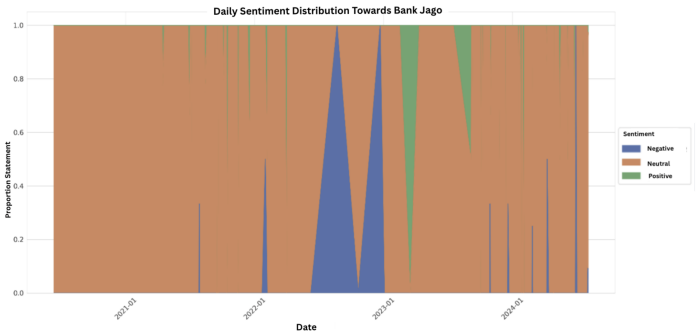

Figure 9. Impact of Events on Sentiment

As illustrated in Figure 9, the chart depicts the distribution of daily sentiment toward Bank Jago from June 2020 to July 2024. The figure highlights noticeable fluctuations in the proportions of positive, negative, and neutral sentiments over time, indicating that public perception is dynamic and responsive to various events.

	Negative	Negative Changes
2022-08-22T00:00:00.000	1	1
2022-12-22T00:00:00.000	1	1
2024-06-28T00:00:00.000	1	1
2022-01-31T00:00:00.000	0.5	0.5
2024-04-08T00:00:00.000	0.5	0.5
2021-07-28T00:00:00.000	0.3333333333	0.3333333333
2023-10-29T00:00:00.000	0.3333333333	0.3333333333
2023-12-19T00:00:00.000	0.3333333333	0.3333333333
2021-07-29T00:00:00.000	0	-0.3333333333
2023-12-22T00:00:00.000	0	-0.3333333333
2022-02-05T00:00:00.000	0	-0.5
2024-04-12T00:00:00.000	0	-0.5
2022-10-21T00:00:00.000	0	-1
2023-01-03T00:00:00.000	0	-1
2024-07-01T00:00:00.000	0	-1

Figure 10. Dates with Significant Changes in Negative Sentiment

As shown in Figure 10, several dates exhibit significant changes in negative sentiment toward Bank Jago. The figure highlights periods where the proportion of negative sentiment increased sharply, indicating moments of heightened dissatisfaction or adverse public reaction. These spikes may be associated with specific events such as technical disruptions, service issues, or unfavorable news that triggered stronger negative responses from users.

Table 4. Summary of Key Events and Negative Sentiment

Date	**Events**	**Sample Tweet**	**Event Summary**
June 28, 2024	Events on 2024-06-28	21 First time using bank jago @jadijago eh ...	Complaint about an unpleasant first experience using Bank Jago.
April 8, 2024	Events on 2024-04-08	128 What's wrong with the bank? 132 Guys anyone want to wtt Qris...	Complaints about errors at Bank Jago and questions about QRIS transactions.
December 22, 2023	Events on 2023-12-22	238 Skg @bibitid service fee for top up app kem...	Complaints about service charges for app top-ups via Seedlings.
January 31, 2022	Events on 2022-01-31	460 Bismillah saving together rekslowly but pa... 445 Bank Jago is really slow ...	Complaints about slow balance entry process at Bank Jago.

Based on Table 4, this analysis can conclude a few things there were several complaints related to errors and service disruptions, which influenced the negative sentiment. There are complaints about slow transaction processing or balance updates. Service fee changes or charges can affect negative sentiment. Some new users experience difficulties or dissatisfaction when first using Bank Jago services. There are questions and possible confusion regarding the use of QRIS.

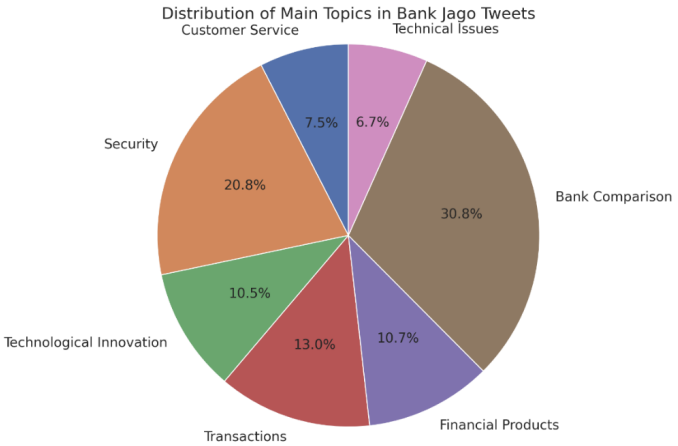

Figure 11. Identify the Main Topic

The pie chart above shows Figure 11, the distribution of the main topics in tweets about Bank Jago. Here is a breakdown of those topics. Bank Comparison: 30.8%, Security: 20.7%, Transactions: 13.0%, Financial Products: 10.7%, Technological Innovation: 10.5%, Customer Service: 7.5%, Technical Issues: 6.7%

Based on this graph, we can conclude some important things This is the most dominant topic, indicating that many users compare Bank Jago with other banks. This could be an indication that users are actively evaluating Bank Jago's position in the digital banking market. Being the second largest topic, it shows that security is a very important aspect for Bank Jago users. This could be a competitive advantage if managed well, or a threat if there are concerns about security. Being the third largest topic, it shows that a lot of the discussion centers on the user experience in conducting transactions at Bank Jago. These two topics have almost

the same percentage, indicating that users are equally interested in the products offered and the technology used by Bank Jago. Although the percentages are smaller, these two topics are still of concern to users and need to be addressed properly to improve customer satisfaction.

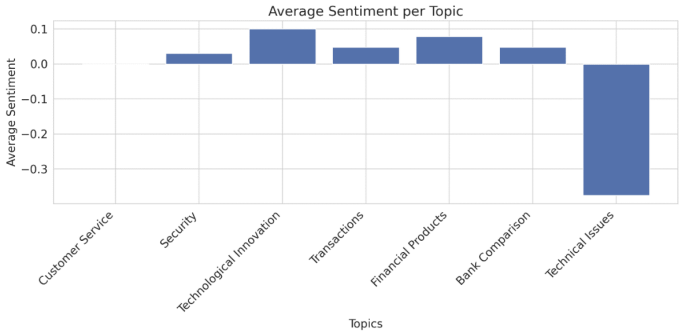

Figure 12. Sentiment per Topic

As shown in Figure 12, most topics exhibit neutral to positive average sentiment. Technological Innovation records the highest positive sentiment, indicating strong user appreciation for digital advancements. Financial Products, Transactions, Security, and Bank Comparison also show moderately positive sentiment, reflecting overall customer satisfaction. Customer Service remains relatively neutral, suggesting mixed experiences among users. In contrast, Technical Issues display a significantly negative sentiment, identifying technical problems as the primary source of customer dissatisfaction.

Table 5. Sentiment Analysis Based on Discussion Topics

Category	**Avg Sentiment**	**Positive**	**Neutral**	**Negative**	**Total**
Customer Service	0	2	32	2	36
Security	0.03	3	96	0	99
Technological Innovation	0.1	7	41	2	50
Transactions	0.05	9	47	6	62
Financial Products	0.08	4	47	0	51
Bank Comparison	0.05	10	134	3	147
Technical Issues	-0.38	1	18	13	32

Based on these results Table 5, we can conclude that overall, sentiment for most topics tends to be neutral or slightly positive, except for Technical Issues which has a negative sentiment. Technology Innovation: Has the highest average sentiment (0.10), indicating that users generally have a positive view of Bank Jago's technological innovations. Technical Issues: Has the lowest average sentiment (-0.38), indicating that this is an area that needs special attention from Jago Bank. Security: Despite having the second highest number of tweets, the average sentiment is relatively neutral (0.03) with no negative tweets, indicating that users feel fairly secure with Bank Jago's services. Bank Comparison: This topic had the highest number of tweets, with a slightly positive average sentiment (0.05), indicating that Bank Jago is generally viewed favorably when compared to other banks. Customer Service: Has a neutral average sentiment (0.00), suggesting there is room for improvement in this aspect. Financial Products: Has a positive average sentiment (0.08) with no negative tweets, indicating that users are generally satisfied with the financial products offered.

3.3. Key Findings

The results of this study indicate that public perceptions of digital banks in Indonesia, particularly Bank Jago, are predominantly positive. Most sentiments expressed on social media emphasize satisfaction with the application's ease of use and the speed of service, reflecting the importance of technological convenience in shaping user experiences. Nevertheless, the findings also reveal recurring complaints related to technical issues and slow customer service responses, which, if left unaddressed, may negatively affect the bank reputation in the long term. These perceptions highlight that while technological innovation is a key driver of customer satisfaction, non-technological aspects such as service responsiveness and data security remain equally critical in sustaining public trust. Consistent with prior studies, the results confirm that user experience and digital

capabilities play a central role in forming perceptions of financial services. However, this study extends existing literature by emphasizing insights derived from public discourse on social media, offering a more user-centered perspective compared to previous research that predominantly focused on financial performance indicators.

The findings of this study provide several important practical implications for digital banks, particularly in managing public perception and responding to criticism expressed on social media platforms. The sentiment analysis results suggest that digital banks should develop more effective and proactive communication strategies, especially in addressing technical problems and customer service-related complaints, which constitute the main sources of negative sentiment. Furthermore, strengthening customer service features is essential, for instance by implementing more responsive support systems such as advanced chatbots or 24/7 customer service to ensure real-time complaint handling. At the same time, given the strong positive perception of technological innovation, digital banks are encouraged to continuously highlight and enhance their technological advantages, including improved data security mechanisms and more efficient transaction services, in order to reinforce their image as modern and reliable financial institutions.

Despite its contributions, this study has several limitations that should be acknowledged. First, the use of social media data, particularly from Twitter, may introduce bias, as it primarily represents the opinions of users who are active on the platform and may not fully capture perceptions from broader demographic groups that are less engaged on social media. Second, the sentiment analysis algorithms employed in this study, although effective, have inherent limitations in interpreting complex linguistic nuances such as sarcasm, irony, or implicit meanings, which may result in misclassification of sentiment. Third, the study focuses exclusively on a single social media platform, whereas public sentiment expressed on other platforms such as Facebook, Instagram, or specialized online forums may exhibit different patterns and dynamics.

Future research is encouraged to expand the scope of data sources by incorporating multiple social media platforms, including Facebook, Instagram, YouTube, as well as customer reviews from mobile applications and official websites, to obtain a more comprehensive and representative view of public perceptions toward digital banks. Additionally, the application of more advanced sentiment analysis techniques, such as deep learning or transformer-based models (e.g., BERT), could improve the accuracy of sentiment classification by better capturing contextual and semantic nuances. Further studies may also benefit from more detailed demographic analyses, examining variations in public perception based on age, gender, education level, or geographic location. Such approaches would provide richer insights and enable digital banks to design more targeted strategies in addressing the needs and expectations of diverse customer segments. Collectively, these future research directions can deepen understanding of how digital banks can continue to innovate and respond more effectively to evolving public perceptions.

4. MANAGERIAL IMPLICATIONS

The analysis of public sentiment toward digital banks in Indonesia, particularly Bank Jago, indicates that the majority of sentiments expressed on social media especially on Twitter tend to be neutral to positive. Compared to other digital banks, Bank Jago generally receives more favorable perceptions, particularly in relation to service innovation, application usability, and ease of access. Positive sentiments are largely associated with features that simplify financial transactions, intuitive user interfaces, and attractive promotional programs, which are perceived as offering faster and more practical services than those provided by conventional banks. Nevertheless, negative sentiments persist and are mainly linked to technical issues such as application errors, service inaccessibility during certain periods, slow transaction processing, and customer service responses that are perceived as less responsive. In addition, concerns regarding personal data security are frequently raised and represent a significant factor influencing user trust.

Further analysis based on demographic characteristics suggests that public sentiment toward digital banking varies across age groups. Younger users, particularly those aged between 18 and 35 years, tend to express more positive and enthusiastic attitudes, reflecting their appreciation of technological convenience, flexibility, and efficiency. In contrast, older users above the age of 40 are more likely to express neutral to negative sentiments, primarily driven by concerns related to data security, service reliability, and system stability. Sentiment variation is also influenced by the platform used to express opinions. Discussions on Twitter are generally concise and direct, often highlighting positive experiences related to digital bank features and ease of use. Conversely, users on online forums and blogs tend to provide more detailed evaluations, which frequently include more explicit criticism regarding technical performance and customer service quality, indicating that

negative sentiments are more pronounced on platforms that facilitate in-depth discussion.

Overall, these findings offer important insights for digital banks in Indonesia in understanding public perception and improving service quality. The dominance of positive sentiment related to ease of use and service speed underscores the crucial role of technological innovation in building public trust, particularly among younger users. However, recurring negative sentiments concerning technical issues and customer service responsiveness highlight key areas requiring immediate improvement. To enhance customer experience and strengthen reputation, digital banks are encouraged to improve the efficiency and responsiveness of customer support systems, for example by increasing customer service capacity or implementing more advanced real-time chatbots. Additionally, ensuring application stability and minimizing service disruptions are essential to reducing negative perceptions, especially among users who experience recurring technical problems. Finally, given persistent concerns about data security, digital banks should adopt more transparent communication strategies regarding security measures to reinforce user confidence, particularly among older customer segments. Collectively, these insights can serve as a foundation for developing more effective communication and service strategies aimed at improving reputation and fostering long-term customer loyalty.

5. CONCLUSION

The research revealed that public perceptions of digital banks in Indonesia, particularly Bank Jago, tend to be positive, especially in terms of technological innovation and ease of service. From the sentiment analysis conducted, it was found that most tweets related to digital banks had neutral to positive sentiments, with the main complaints focused on technical and customer service issues. This research makes a significant contribution to the understanding of how public sentiment on social media affects the reputation of digital banks, as well as how these perceptions can vary based on specific topics.

The results of this study can be used by digital banks to improve their services and strengthen their reputation in a competitive market. One key implication is the need for digital banks to pay more attention to customer service aspects and the technical stability of their applications, given that these are key areas where criticism often arises. Digital banks can also capitalize on the positive sentiments that arise regarding technological innovation to strengthen their image as innovative and efficient institutions. For real-world implementation, digital banks can implement several steps including a more proactive communication and marketing strategy by leveraging insights on topics that the public is most passionate about, digital banks can focus on marketing their technological innovations and build campaigns that highlight these advantages. Improved Customer Service: Digital banks need to develop faster and more responsive customer support systems, either through additional staff or the development of intelligent chatbots to handle complaints in real-time. Application Technical Improvements: Given that technical issues are often a source of negative sentiment, digital banks should prioritize the stability and reliability of their apps to improve user experience.

Based on the existing sentiment analysis, it was found that, the collected data already has an initial sentiment classification in positive, negative, and neutral categories. These classifications were then converted to numerical values (1 for positive, -1 for negative, and 0 for neutral). Lexicon or rule-based techniques seem to be used in this initial sentiment classification, which allows sentiment assessment without the need for machine learning models specifically trained on this dataset. The main analysis focused on clustering tweets by topic and aggregating sentiment scores for each topic. This resulted in the finding that ”Technological Innovation” was the topic with the highest average sentiment, while ”Technical Issues” had the lowest sentiment. Through this analysis, the research has shown the importance of public understanding of digital bank services, especially in the context of the topics that have the most influence on the overall perception of banks. The recommendations provided are expected to help digital banks improve their reputation and performance in the eyes of the public.

6. DECLARATIONS

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6.2. Author Contributions

Conceptualization: EA, SS, AP, and MR; Methodology: EA, SS and AP; Software: SS, and AP Formal Analysis: EA, SS, AP and MR; Investigation: EA, AP and MR; Resources: EA, SS, and AP; Data Curation: EA, SS and AP; Writing Original Draft Preparation: EA and AP; Writing Review and Editing: SS, EA, and AP; Visualization: SS, AP, and MR; All authors, EA, SS, AP, and MR have read and agreed to the published version of the manuscript.

6.3. Data Availability Statement

The datasets used to support the findings of this study are available from the direct link in the dataset citation.

6.4. Funding

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

6.5. Declaration of Conflicting Interest

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

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