





## A Twitter Sentiments Analysis on Islamic Banking Using Drone Emprit Academic (DEA): Evidence from Indonesia

### Analisis Sentimen Twitter terhadap Perbankan Islam Menggunakan Drone Emprit Academic (DEA): Evidensi dari Indonesia

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#### ABSTRACT

The research aimed to identify and collect issues discussed regarding Islamic banking from user activity, sentiments, and content on Twitter. This study used a qualitative approach by collecting data on 145,475 conversations from Twitter using the Twitter Crawling technique with the Drone Emprit Academy (DEA) engine from 28 July 2020 – 10 March 2023 in Indonesia. Text data mining is used with the help of the DEA system by analyzing sentiment, Social Network Analysis (SNA), and other Twitter data analysis. The results showed that the highest number of tweets related to Islamic banking came from the number of tweets which were dominated by millennials and millennials with positive sentiments of 66%, then negative sentiments of 28% and neutral sentiments of 5%. From these results, both positive, negative and neutral sentiments are a challenge for various stakeholders in the field, including academics, government and others, in a more massive manner to explain and provide a more solid and stronger understanding of Islamic finance, especially Islamic banking.

**Keywords:** Islamic Banking; Sentiments Analysis; Twitter; Academic Emprit Drone

#### ABSTRAK

Penelitian bertujuan untuk mengidentifikasi dan mengumpulkan isu yang dibahas terkait perbankan syariah dari aktivitas pengguna, sentimen, dan konten di Twitter. Metode ini menggunakan pendekatan kualitatif dengan mengumpulkan data 145.475 percakapan dari Twitter menggunakan teknik Twitter Crawling dengan mesin Drone Emprit Academy (DEA) dari tanggal 28 Juli 2020 – 10 Maret 2023 di Indonesia. Text data mining digunakan dengan bantuan sistem DEA dengan menganalisis sentimen, Social Network Analysis (SNA), dan analisis data Twitter lainnya. Hasil penelitian menunjukkan jumlah tweet tertinggi terkait perbankan syariah berasal dari jumlah tweet yang didominasi oleh kaum millennials dan zillenial dengan sentimen positif sebesar 66%, kemudian sentimen negatif 28% dan sentimen netral sebesar 5%. Dari hasil tersebut, baik sentimen positif, negative, maupun netral menjadi tantangan bagi berbagai pemangku kepentingan di lapangan, termasuk akademisi, pemerintah, dan lainnya, secara lebih massif untuk menjelaskan dan memberikan pemahaman yang lebih kokoh dan kuat tentang keuangan syariah khususnya perbankan syariah.

**Kata Kunci:** Perbankan Syariah; Analisis Sentimen; Twitter; Drone Emprit Akademik

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## I. INTRODUCTION

Islamic banking is one of the Islamic financial sectors based on sharia principles, such as fairness, transparency, and anti-usury, making this banking system increasingly trusted and in demand by people who want to fulfill their financial needs in a halal way and in accordance with Islamic values (Izza, 2022; Fakhrunnas, 2023). As a Muslim-majority country in the world, the growth of the Islamic banking industry in Indonesia continues to increase along with the increasing public awareness of the importance of carrying out financial activities in accordance with sharia principles (Hidayati et al., 2017).

Based on data from the Financial Services Authority (OJK) during 2022, the assets of the Islamic financial industry have reached IDR 2,375.84 trillion, an increase from 2021 of IDR 2,050.44 trillion or grew 15.87% higher than 2021 which amounted to 13.82% year on year (Financial Services Authority, 2022). In terms of Islamic banking product development, a number of innovations have been made by the Islamic banking industry. One of the latest innovations is the development of digital technology-based financing products, such as online loan services and mobile banking carried out by several Islamic banks.

On the other hand, the development of technology and social media has had a significant impact on various aspects of human life, including in the banking world. These changes bring new opportunities to understand how people respond to innovations in the financial industry, especially those related to Islamic banking (Anwar, 2019). One method that can be used to determine public perception is to use the sentiment analysis approach, which is an important tool of choice for understanding public perception because it can provide valuable insight into the views, emotions, and attitudes that exist among the public towards various topics, products, brands, or events (Dusuki & Abdullah, 2007). Compared to other analytical tools, such as surveys or interviews, sentiment analysis has advantages in terms of scale and speed. Surveys tend to require greater time and resources to collect data from respondents, while sentiment analysis can collect data in real time from various online sources (Hutto & Gilbert, 2014). Moreover, in the context of marketing and business decision-making, sentiment analysis can provide a more authentic view of consumers as the data analyzed are spontaneous responses expressed purely by individuals (Chen et al., 2012). This is because social media has become a means for people to express opinions, emotions, and spread news, both in the form of facts and hoaxes (Zhang et al., 2018).

In the current information age, Twitter has become one of the main channels where people can express their views and responses to various topics, including Islamic banking. This is because Twitter has become the leading social media platform used by the public in expressing their perceptions or behavior towards various issues (Rahmanti et al., 2022; Wariantos et al., 2022). Based on the Digital report (2022), Indonesia is one of the countries with the largest Twitter users in the world. The number of Twitter users in Indonesia reached 18.45 million in 2022. This number is equivalent to 4.23% of the total Twitter users in the world which reached 436 million. The number of Twitter users in Indonesia in 2022 also increased by 31.3% compared to 14.05 million a year earlier (Kemp, 2022).

Furthermore, in the context of this study, Innovation Diffusion Theory is adopted in explaining how innovations or new ideas are accepted and spread in a particular society or environment (Dang-Xuan et al., 2017). The Innovation Diffusion Theory, developed by Everett Rogers, is a useful framework for understanding how innovations or new ideas spread in society. This theory identifies various groups in society, such as innovators, early adopters, early majority, late majority, and laggards, which have different roles in adopting innovations. In the case of the Islamic banking industry, this theory can help in understanding how new products and services are adopted by the Muslim community (Rogers & Quinlan, 2014). With Twitter sentiment analysis towards Islamic banking can be considered an innovation or an emerging topic in the context of banking and technology. This theory helps to understand how sentiment towards Islamic banking spreads among Twitter users, as well as the factors that influence the acceptance and spread of such sentiment.

Some previous studies relevant to this research were conducted by Anwar & Badri (2022) who highlighted the growth of the Islamic banking industry in Indonesia. They noted that this growth is in line with increasing public awareness of sharia principles, and this provides an important basis for this study which seeks to understand how innovation affects the Islamic banking industry. Research by Rahmayati (2021) reviewed the impact of technology and social media in changing the paradigm

of the banking industry as a whole. The discussion is relevant to understanding how technology plays an important role in the development of Islamic banking and innovation in it. As well as how the public responds to innovations in Islamic banking through social media (Ahmad & Hussain, 2021).

Some previous studies that focused on observing the perception and development of Islamic banking through social media were conducted by Mishan S. Alotaibi (2013) who analyzed Twitter messages in the Saudi banking sector. Cahyono et al., (2020) analyzed social media marketing efforts by Islamic banks in Indonesia between 2007 and 2018. Haidar et al. (2022) examined perceptions of digital Islamic banking using SentiStrength. As shown in the literature, researchers found that research related to sentiment using social media twitter is still limited and researchers have not found research that examines sentiment analysis of Islamic banking in Indonesia with the Drone Emprit Academic approach. Thus, this research became the first to discuss the topic with different platform objects and keywords, resulting in new visualizations. Based on the results of previous research, no research has been found that discusses sentiment towards Islamic banking using Twitter social media data by utilizing the Drone Emprit Academic (DEA) system with a case study in Indonesia. Drone Emprit Academic (DEA) was chosen as the right tool in this research because it allows real-time data collection from the Twitter social media platform, including sentiment analysis. The advantages of DEA include direct access to real-time data, scalability for representative data collection, ease of use, and accuracy and reliability in collecting data. With these features, DEA facilitates researchers to understand public sentiment related to Islamic banking and supports accurate and relevant scientific research.

Based on this background, the researcher intended to fill the research gap by analyzing public sentiment on Twitter social media towards Islamic banking in general, both in terms of services, products, security and so on, using various types of approaches with processed data taken from Drone Emprit Academic (DEA). Thus, this research aimed to see, identify, and collect frequently discussed issues related to Islamic banking from user activity, sentiment, and content on Twitter. With the analysis conducted, it expected to provide an overview to the general public and policy makers that there are various kinds of public sentiments towards Islamic banking. Hopefully, it can be a basis for improvement by related parties to existing public sentiment, especially negative sentiment.

## II. RESEARCH METHODS

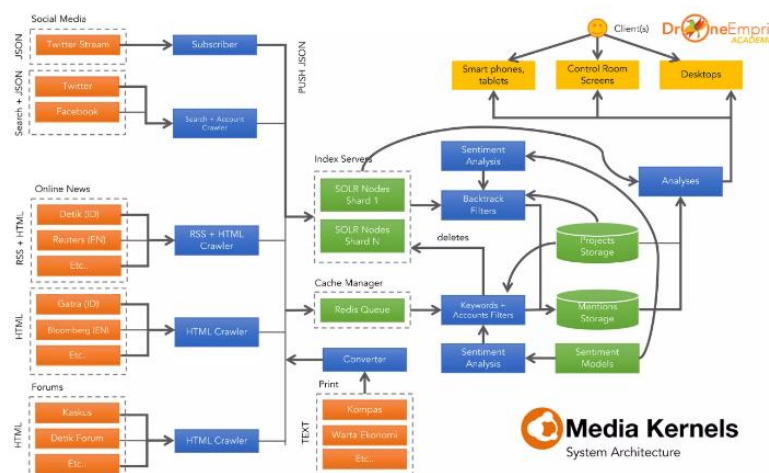
This research combined qualitative methods by collecting and analyzing 145,475 total Twitter conversations with the keywords "banking", "bank", "sharia" collected in the last 2 years from July 28, 2020 - March 10, 2023 using the Drone Emprit Academic (DEA) engine. The determination of a two-year period as the observation period in this study was based on the consideration that it was a long enough period to observe developments and trends that might appear in conversations about Islamic banking on Twitter. This is in accordance with the longitudinal analysis approach, which allows for a deeper understanding of changes over time (Yin, Alkhalifa & Zubiaga, 2021; Sotudeh et al., 2022; Liang & Lu, 2023). In short, the time span was chosen to see the overall track record of conversations related to Islamic banking on Twitter. In addition, Twitter is one of the platforms where users can express support and criticism on certain topics quickly. With the 2-year time span used, this research attempted to observe the support for Islamic banks, especially after the emergence of BSI in early 2021, increased or decreased, as well as identify issues that became the main focus of criticism and how the Islamic banking industry in general. As is known, the Financial Services Authority (OJK) officially issued a permit for the merger of the three Islamic bank businesses on January 27, 2021 through letter Number SR-3/PB.1/2021. Furthermore, on February 1, 2021, President Joko Widodo inaugurated the presence of BSI (bankbsi.co.id). Finally, the two research questions answered in this context are: Is there an increasing or decreasing trend of support for Islamic banks on Twitter during the time span under study? In addition, this research also sought to identify the main issues that have been the focus of criticism of Islamic banking on the Twitter platform in the last two years.

The collected data included user profiles (user id, username, number of followers), tweet data (user, timestamp, geolocation, retweet count, reply count, and tweet content). Then the data were collected by using the Drone Emprit Academy (DEA) Twitter crawling technique (<https://dea.uui.ac.id/>) developed by Media Kernel Indonesia. Drone Emprit is able to monitor and analyze social media, online news, and other sources in near real-time (Fahmi et al., 2021). Twitter social media analysis is popularly used because it is a source of data that is quite large and easily accessible. In managing social media data,

especially Twitter, the Drone Emprit Academic (DEA) system uses the Application Program Interface (API) service from the Twitter platform to collect conversations in real time using the streaming method which is one of the methods in collecting data from Twitter used to obtain real-time data from the social media platform (Fahmi, 2018). As for this collection using keyword restrictions, namely "bank", "banking", and "sharia". Furthermore, the Twitter developer provides the Twitter Search API to get near-real-time access to the latest collection of tweets published in the last 7 days filtered through a specific query (Miftahuddin et al., 2023). The results displayed were in the form of percentage trends, retweet relationships, mention trends graphs, most retweeted statuses, conversation trends. Thus, these data can make a reference for reading various and current social phenomena (Arianto, 2020). The "lexicon" method is utilized to classify public conversations based on sentiment by collecting words classified as positive, negative, or neutral (Miftahuddin, 2023). As for the research process shown in Figure 1, the API performed a DEA search (Step 1) to collect the requested tweets and the data was collected from Twitter Streaming and Twitter Crawl (Step 2) and processed them into the index server based on the SOLR system described in the DEA big data architecture framework as shown in figure 2.



Figure 1. Research Process



Source: Fahmi, 2016

Figure 2. Drone Emprit Academy (DEA) Big Data Architecture

### III. RESULTS AND DISCUSSION

Furthermore, this chapter were explained based on the results of Twitter Crawling conducted by Drone Emprit Academic including the demographic characteristics of users which were then analyzed to understand the user profile. Furthermore, frequency analysis of words was conducted to identify important patterns in the conversation. Sentiment analysis was conducted to measure sentiment in the form of positive, negative, and neutral. Then, Social Network Analysis (SNA) was used to describe the relationship and influence between users and explain conversation clusters. Finally, bot analysis was used to recognize automated accounts that could influence the conversation.

### Distribution of Users by Age

Twitter demographic distribution refers to the distribution of Twitter users based on various demographic characteristics such as age, gender, and geographic location. In this section, we will provide an explanation of the distribution of Twitter users by age.

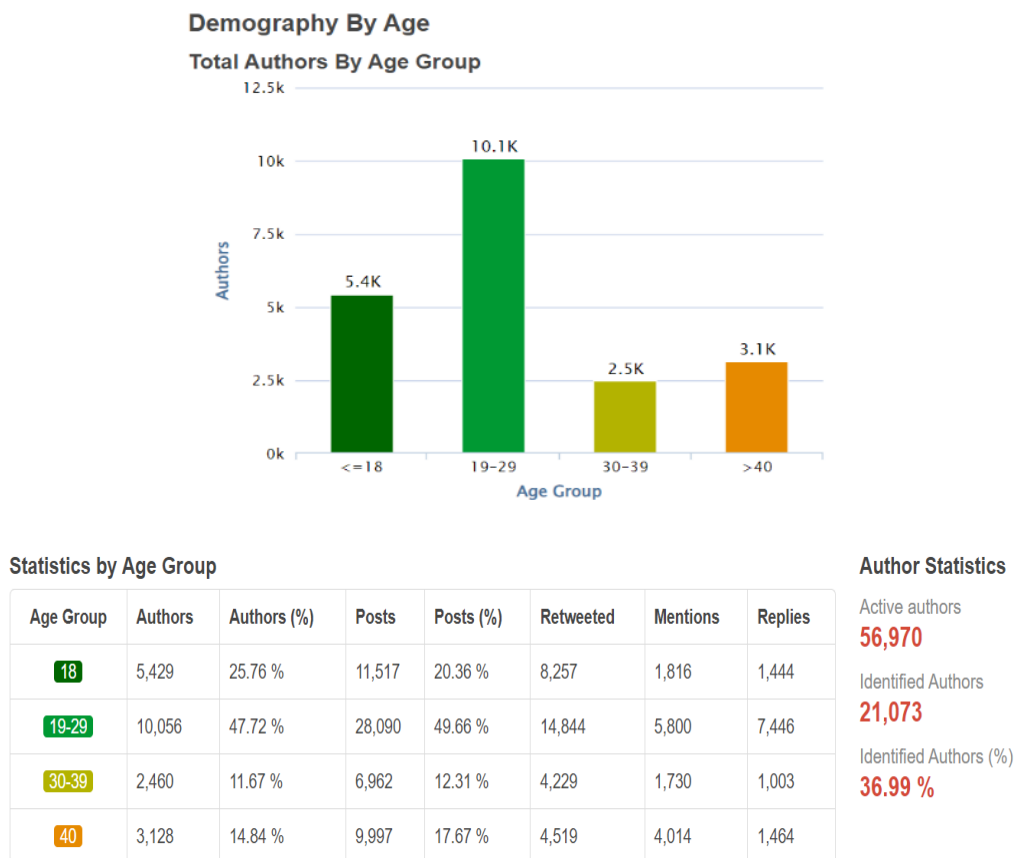


Figure 3. Distribution of Total Authors by Age

From the results of the analysis, it can be seen that conversations related to Islamic banking on Twitter were dominated by the millennial generation as much as 47.72% or 28,090 active users and the zillennial generation as much as 25.76% or 11,517 active users on twitter social media. This is in line with the 2021 Sharia Economics & Finance Report which noted that technology penetration is currently deepening in the world community, especially in Indonesia, which has 53% of the millennial and gen-Z generation population. Around 73.7% of Indonesia's population is recorded to have internet access, exceeding the global figure of 59.5% (Bank Indonesia, 2021). Therefore, the development of Islamic finance in Indonesia should pay attention to the profiles of the two generations, namely millennials and zillennials. This is because millennials are starting to dominate the population pyramid. The demographic bonus of the millennial generation is a great opportunity for Islamic finance to grow in order to build a loyal, progressive and financially strong customer base (Bappenas, 2018).

In taking these opportunities, it is necessary to continue efforts to increase the level of Islamic financial literacy and inclusion through increasing education and socialization programs to the public, increasing innovation, capability, and competitiveness of the Islamic financial services industry (OJK, 2023). Based on the results of SNLIK 2022, the financial literacy index of the Indonesian people was 49.68%, an increase compared to 2019 which was only 38.03%. While this year's financial inclusion index reached 85.10%, an increase compared to the previous SNLIK period in 2019, which was 76.19%. This shows that the gap between literacy and inclusion levels is decreasing, from 38.16% in 2019 to 35.42% in 2022 (OJK, 2022). Based on ADB Institute research, financial literacy is an intrinsic factor that influences and motivates people to seek information and act on what they know. It can be concluded that indirectly, an increase in the Islamic financial literacy index will increase

the Islamic financial inclusion index, in line with the greater public knowledge of financial products and services (OJK, 2023).

### Distribution Based on User Location

Location-based distribution of Twitter users refers to the distribution or dispersion of Twitter users around the world or within a specific region. Information about a user's location can provide valuable insights into the geographic distribution of users, local preferences, and different trends in different regions.



Figure 4. Demographics by User Location

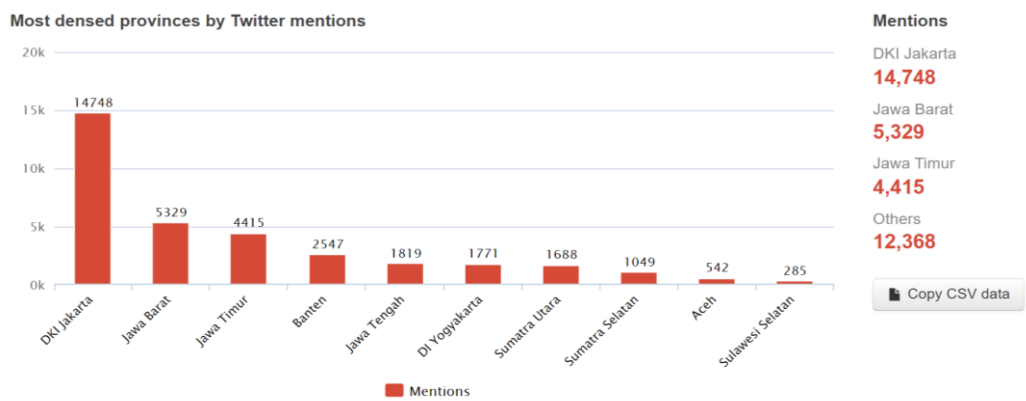


Figure 5. User Demographics by Province

Furthermore, the demographic data of users from twitter conversations related to Islamic banking includes provinces in Indonesia. Figure 5 shows the total distribution of tweets in Indonesia with DKI Jakarta being the province that has the most conversations related to Islamic banking (14,748 conversations) followed by West Java (5,329 conversations) and East Java (4,415 conversations).

### Twitter Data Analysis Wordcloud



Figure 6. Wordcloud

Furthermore, from the results of the conversation, analysis was carried out through a word frequency tool through wordcloud to find problems/issues that are often discussed with the highest repetition. The word size in the word frequency results showed a higher frequency of occurrence than others. With the help of keyword analysis, it is intended to gain an understanding of the current trends of research topics. Based on the 100 wordcloud word frequencies, it was found that the words with the highest frequency were BSI (294), system (125), and charity (100). In addition, the results also showed some other interesting relevant terms such as cooperation, banking, socialization, improve, employee, financing, and others.

**Table 1.** Wordcloud Categorization

Categorization	
Positive	Negative
BSI	investment
charity	syariah
system	conventional
cooperation	socialization
humanity/humanity	riba
financing	corruption
activities	interest

In the results of the wordclouds categorization by the Drone Emprit system, there was an interesting finding that words such as "sharia," "investment," and "corruption" were part of the words that contributed to the negative sentiment in the conversation on Twitter. This reflects the complex and controversial dynamics within the Islamic banking industry. There is debate over the true understanding of the concept of "sharia," where in practice, the name "sharia" may seem appropriate, but the practice does not always match the original meaning. This is reflected in a tweet from the account @gadisresidu\_b3 that compares Islamic Banks to conventional Banks, highlighting that Islamic Banks look for various reasons to avoid being called "riba." In addition, the word "investment" appearing in the context of negative sentiment may reflect disapproval or concern regarding investment in certain situations. Finally, the word "corruption" contributing to the negative sentiment reflects concerns over unethical behavior in the banking sector and also highlights ethics-related issues in the financial industry. These findings emphasize the complexity of issues related to Islamic banking and how the diversity of opinions and views among social media users reflects the diversity in thinking.



**Figure 7.** Hashtags

**Hashtags**

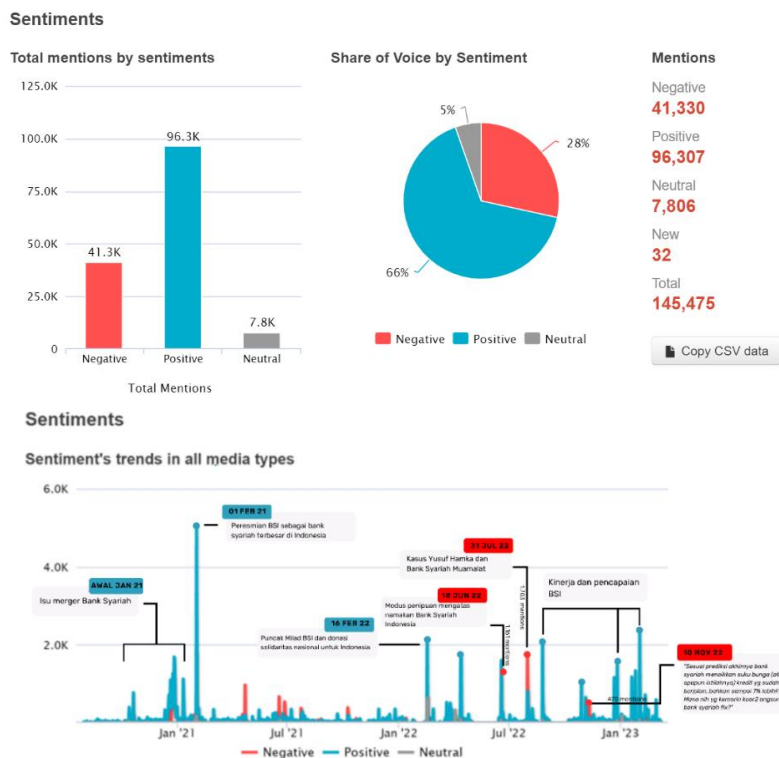
The next result is the analysis of hashtags. The main purpose of selecting relevant hashtags was to find relevant topics from the field. This selection aimed to show the direction of the research which was then analyzed to find the accurate combination of relevant keywords (Figure 7) related to the knowledge of Islamic banking topics. With the help of this analysis, we can get an understanding of the current trend of halal topics as presented in the following table:

**Table 2.** Topic Trends by Hashtags

No.	Topics	Hashtags
1.	Performance	#BSINation (3.728 tweets)
		#BangkitBersamaET (3.047 tweets)
		#BankSyariahIndonesia (2.886 tweets)
		#Milad2thBSI (2.564 tweets)
		#GaspolkinerjapositifBSI (2.457 tweets)
		#BSIBrightissue (1745 tweets)
	Program	#BersatuUntukIndonesia (1.280 tweets)
		#BSISolidTumbuh (935 tweets)
		#BSIDukungGernasBBI (1374 tweets)
		#BSIinvestmentoutlookAceh (1330 tweets)
		#KURBersamaBSI (1233 tweets)
	Literacy	#TalentaWirausahaBSI2023 (1214 tweets)
		#BSIGlobalDukungG20 (7498 tweets)
Charity	#BSICharityConcert2023 (545 tweets)	
	#ProUMKM (383 tweets)	
2.	Complaint,Complaint, Complaints	#KuisSahabatSyariah (325 tweets)
		#SobatRupiah (263 tweets)
		#KuiswebseriesBSI (57 tweets)
		#ZakatBSIUntukIndonesia (1828 tweet)
		#freepalestine (201 tweets)
		#HindariModusPenipuan (2791 tweets)
		#BoikotSyariahMandiri (1517 tweets)
		#KorbanBankBSI (447 tweets)
		#BankMegaSyariahMaling (319 tweets)

### Sentiment Analysis

Drone Emprit Academic (DEA) presented interesting and significant results in conducting social media analysis in the form of netizen/public sentiment on the analyzed topic. According to Miftahuddin et al., (2023), the "lexicon" method is utilized to classify public conversations based on sentiment by collecting words classified as positive, negative, or neutral as illustrated in Figure 8 which is the result of sentiment analysis on the topic of Islamic banking and presented in more detail regarding sentiment trends based on time periods:



**Figure 8.** Sentiment Analysis



Based on the analysis period, 66% or 96,307 netizen conversations had a positive sentiment and 28% or 41,330 conversations had a negative sentiment. Meanwhile, only 5% or 7,806 mentions were recorded as neutral. Conversations with positive sentiments were generally a form of public enthusiasm for the presence of BSI, performance, and humanity values in Islamic banking. While negative sentiments were about cases involving big figures so as to reduce trust in Islamic banking, people do not fully believe in the sharia of Islamic banks, facilities related to business interests that cannot be fulfilled by Islamic banks and so on. The exposure of conversations and sentences that have been grouped based on the DEA machine lexicon with positive and negative sentiments as follows:

**Table 3.** Conversations Based on Sentiment Results

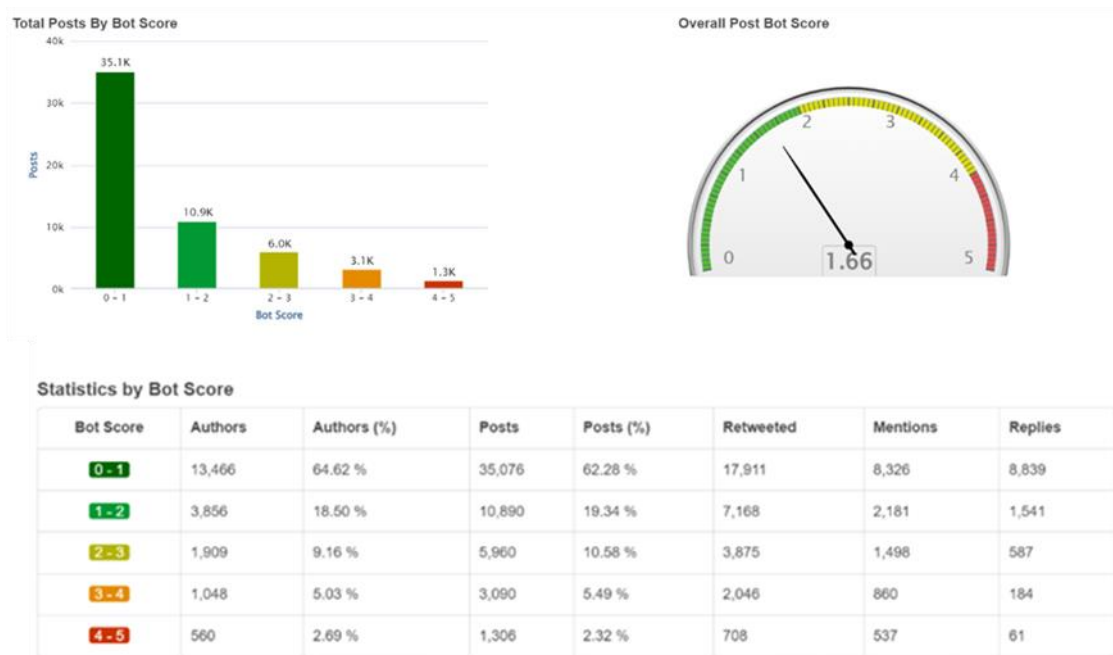
Sentiment	Account	Mentions	Retweet
Positive	@tjhinfar	President Director of Bank Syariah Indonesia Hery Gunardi said this is a form of Baznas and BSI's seriousness in efforts to strengthen and distribute the zakat ecosystem and the Love Zakat Movement which was inaugurated by President @jokowi on May 15.	128
	@And_Hongg	#ZakatBSIUntukIndonesia <a href="https://t.co/Yi1kv49oWZ">https://t.co/Yi1kv49oWZ</a> Really appreciate Bank Syariah Indonesia and this is something that should be emulated by all companies because in addition to paying taxes, they also issued zakat amounting to 72 M. #ZakatBSIUntukIndonesia which is prosperous and healthy for its people <a href="https://t.co/Ey5hoaw1sf">https://t.co/Ey5hoaw1sf</a>	124
	@And_Hongg	May Bank Syariah Indonesia continue to strengthen its determination to build the nation, continue to contribute to creating change, continue to collaborate and integrate to explore the ideals of the Indonesian nation, to be the best.	105
	@Nirfi_55	@ErickThohir @bankbsi_id #BSINation <a href="https://t.co/gqd5L0132u">https://t.co/gqd5L0132u</a> Virtual Charity Concert #BSINation repeated this first year hopefully BSI can be a barometer of Islamic banking in Indonesia @bankbsi_id <a href="https://t.co/uNFdCsh1yA">https://t.co/uNFdCsh1yA</a>	96
	@denni_sauya	In its development, Bank Syariah Indonesia has a long history, now not only specifically for Muslims, but attracts customers from various backgrounds.	85
	@AntoniusCDN	#GaspolkinerjapositifBSI <a href="https://t.co/TisBRbSOPT">https://t.co/TisBRbSOPT</a> Bank Syariah Indonesia was formed for all people regardless of ethnicity, religion and class.	81
	@Nirmala_0106	So take the advantages of BSI for your finances#GaspolkinerjapositifBSI <a href="https://t.co/fVOzphiw3o">https://t.co/fVOzphiw3o</a> In addition to capital support, Bank @bankbsi_id also provides business development assistance through training, licensing, marketing and Islamic financial literacy.	69
Negative	@gadisresidu_b3	#KURBersamaBSI <a href="https://t.co/e3tdKzOCN1">https://t.co/e3tdKzOCN1</a> 1.Risks of Islamic Debt at Mu*m*1*t Bank Joko Areso's article	
	@gadisresidu_b3	In 2015 I took out a loan at Mu*m*1*t Bank for Rp.180,000,000 (15 years). For 7 (seven) years I have always paid installments on time, never experienced delays. <a href="https://t.co/CI5YwUCKcL">https://t.co/CI5YwUCKcL</a>	4,371
	@gadisresidu_b3	The difference between Islamic and conventional banks. Conventional banks are purely profit-oriented from the funds they manage. Islamic banks look for many reasons to avoid being called riba. <a href="https://t.co/5ieYYMScKz">https://t.co/5ieYYMScKz</a>	2,304
	@horuses_eye	@gadisresidu_b3 There is no such thing as an Islamic bank, there are conventional banks that use Arabic. -former bankers- DHUAAAR!!	1,852
	@PartaiSocmed	As predicted, Islamic banks finally raised interest rates (or whatever the term is) on existing loans, even up to 7% more!!!	861



reinforce negative sentiments towards Islamic banks by reporting problems or controversies that may exist within the Islamic banking industry. By highlighting negative aspects or faults in Islamic banks, the news has the potential to negatively impact public perception of the sector.

### Bot Analysis

Furthermore, in the polarization of SNA, bot analysis is carried out to find out whether the conversation occurs naturally or not. Bot analysis is conducted to determine whether bot or fake accounts are accounts in social media that are controlled by certain software programs for their content and behavior. Bot accounts themselves can distort the hubbub of voices on social media so that it looks as if it is true that many people are talking about it or, even worse, be considered a public voice and even become a strategy for manipulating public opinion on social media (Mosioi & Mailoa, 2021). Therefore, in analyzing Social Network conversations in cyberspace, we should also detect the presence of bots and what the pattern of conversations using bots is, to see whether there is manipulation of public opinion or not.



**Figure 10.** Bot Account Analysis

In Figure 10 shows a botometer which is a tool for checking the activity of a Twitter account and scoring the probability that the account is a bot (robot) with the following score:

- Skor 0-1, indicates the activity and interactions are consistent with patterns expected from a human account, and there are no suspicious signs of bot activity.
- Skor 1-2, has some very minimal signs of bot activity, but is generally considered a legitimate human account. The interaction patterns may vary slightly, but still tend towards human accounts.
- Skor 3-4, Interaction patterns may be more mixed, and there are more obvious signs of bot activity. The activity may be suspicious and inconsistent with human interaction patterns typically seen on the platform.
- Skor 4-5, considered to have very strong signs of being a bot account. The activity is highly suspicious and often lacks the characteristics of normal human interactions.

From the results of the analysis of bot accounts based on the number of posts from users, it can be concluded that in general, posts from users occur naturally which were dominated by the 0-1 range bot score of 35,076 posts (62.28%) with 13,466 users (64.62%) involved, followed by posts with a range of 1-2 as many as 10,890 posts (19.34%) with 3,856 users (18.50%) involved. On average, the overall score of posts by bot was found to be 1.66. This figure of 1.66 confirms that there was a fairly small number of robot accounts that attest to the natural conversations taking place on Twitter. In other words, the conversations that occur are not fabricated or manipulated. Thus, it can be concluded that the conversations that occur on the discussion of Islamic banking, both supporting and criticizing,

are a form of public aspiration represented by netizens. This further confirms that social media as a channel for civic aspirations related to the discussion of sharia banking.

### **Findings**

In the current era of digitalization, Twitter has become a very popular social media platform as a platform for conversations about topics of interest, including politics, popular culture, and social issues (Jackson et al., 2018; Rusydiana & As-salafiyah, 2022; Mude & Undale, 2023). From the results that have been carried out, several Twitter conversations about Islamic banking were found.

The first finding was based on the number of tweets dominated by millennials and zillennials (Figure 1). The dominance of the younger generation is also a bonus for Indonesia's demographics as well as opportunities and challenges in carrying out digital transformation both in financial literacy and in the provision of financial services sector products and services (OJK, 2020; Rossana & Firmansyah, 2019; Septiani et al., 2021; Syafrida et al., 2020). For this reason, it is necessary to understand their behavioral perspective on the attributes of Islamic banks in order to increase competitiveness (Rossana & Firmansyah, 2019). In addition, Islamic banks must be able to read opportunities and identify what factors are needed by not ignoring the characteristics of young people who are a manifestation of global cultural flows (Mohamed Nasir, 2022).

The second finding was the analysis through word frequency tool through wordcloud (Figure 7) and hashtags (Figure 8) related to problems/issues that are often discussed with the highest repetition and it was found that the words with the highest frequency were BSI (294), system (125), and charity (100). This research shows that BSI is the most discussed Islamic bank on Twitter compared to other Islamic banks. This is also in line with research conducted by Rahmat & Rantisi (2021) which found that as many as 38% of conversations discussed BSI, indicating that BSI has high brand strength and has a more effective marketing strategy on social media. In addition, BSI has also launched various innovative products and services that meet customer needs, thus gaining more attention from Twitter users. These findings can provide useful insights for BSI and other Islamic banks in improving their brand image on social media. By improving their image on social media, Islamic banks can increase public awareness of their products and services and expand their customer base.

The third finding was sentiment analysis which was dominated by positive sentiment of 66% with enthusiastic conversations about the presence of BSI, performance, and humanity values in Islamic banking. While negative sentiments of 28% were conversations related to the reputation of Islamic banks, people do not fully believe in the sharia of Islamic banks, facilities related to business interests that cannot be fulfilled by Islamic banks and so on. In this case, it is important for Islamic banks to continue to maintain their reputation, especially related to carrying out Islamic bank activities in accordance with sharia principles. Do not let business goals cause Islamic banks to neglect maintaining the suitability of sharia principles. Finally, a neutral sentiment of 5% indicates that there is still a knowledge gap related to Islamic banking. From these results, both positive, negative, and neutral sentiments are a challenge for various stakeholders in the field, including academics, government, and others, more massively to explain and provide a stronger and stronger understanding of Islamic finance, especially Islamic banking.

Finally, the findings related to Social Network Analysis (SNA) found that there are 4 main clusters including the pro cluster / positive sentiment towards Islamic banking, the counter cluster / negative sentiment, the cluster of the role of religious leaders in socializing Islamic banking, and the mass media in delivering information / news about Islamic banking. Cluster analysis shows the relationship between the pro cluster and religious leaders. The negative cluster with the role of mass media. This means that the support of religious leaders for Islamic banks provides legitimacy to financial practices based on sharia principles and strengthens positive views among adherents of the same religion. On the other hand, clusters with skeptical views towards Islamic banks are affected by the role of mass media which can create or reinforce negative views through reporting that emphasizes negative aspects or faults in Islamic banks, affecting public perceptions of the sector. The importance of strengthening understanding and changing the mindset of the public through the role of religious leaders as well as cooperating with the mass media, in preaching Islamic banking.

The findings of this research can be linked to the concept of Innovation Diffusion Theory. First, the dominance of younger generations such as millennials and zillennials in Twitter conversations illustrates that these generations act as early adopters in the diffusion of innovation. They are quicker to accept and participate in conversations about Islamic banking, creating an important momentum

in innovation adoption. Furthermore, findings related to the main focus on Bank Syariah Indonesia (BSI) show that BSI has successfully implemented effective innovation and marketing strategies. In the context of the Diffusion of Innovation Theory, BSI can be considered as an innovator that has successfully attracted the attention of the public. Positive and negative sentiment analysis reflects the different stages in the innovation adoption process, with positive sentiment reflecting initial acceptance and negative sentiment reflecting hesitation or resistance. Finally, Social Network Analysis (SNA) highlights the important role of religious figures in socializing Islamic banking, which is in line with the concept that influencers or authority figures can accelerate innovation adoption. Overall, the Diffusion of Innovations Theory helps explain how innovations in Islamic banking are spread, accepted and influenced by the public through social media platforms such as Twitter. Finally, from these findings, it is expected to improve the Islamic financial services ecosystem and become one of the relevant supporters for Indonesia in realizing the SDGs (Sustainable Development Goals) and become the main strategy for accelerating Islamic economic growth in Indonesia.

#### **IV. CONCLUSION**

Along with the dynamic population of Muslim communities around the world. The increase in population has an impact on the high demand for halal products globally. The awareness of the Muslim community about halal products is increasing rapidly. In addition, the rapid development of technology is an opportunity to see the response and social phenomenon of netizens to the halal industry. Public interest and response can be identified through social media, one of which is Twitter. Twitter is the leading social media platform used by netizens in expressing their perceptions or behavior on various issues. Based on this background, this research raises a topic that discusses sentiment analysis with the Drone Emprit Academic approach (SNA).

The results showed that the highest number of tweets related to Islamic banking came from the number of tweets dominated by millennials and zillennials with a positive sentiment of 66%, then a negative sentiment of 28% and a neutral sentiment of 5%. From these results, both positive, negative, and neutral sentiments are a challenge for various stakeholders in the field, including academics, government, and others, more massively to explain and provide a stronger and stronger understanding of Islamic finance, especially Islamic banking.

This research also provides practical implications, underscoring the need for intensive efforts from stakeholders, including the government and academia, to educate the public about Islamic finance, especially Islamic banking. Although positive sentiments dominate, the challenges of negative and neutral sentiments should be addressed through identifying the issues that may be causing them. Thus, the public's understanding of Islamic finance can be stronger, creating a broader positive perception. Then, from an empirical perspective, this study provides an in-depth insight into how the public, especially the younger generation, responds to the topic of Islamic banking on social media. The results of this study can be used as a basis for developing more targeted education programs and information campaigns, to increase understanding of Islamic finance.

Finally, it should be noted that this study has limitations, namely the data used were still representative of social media, namely Twitter, which was limited and the results for the future are dynamic. Recommendations for further research can refer to data with other social media analysis such as Facebook, Instagram, Youtube, Tiktok, and others to get more comprehensive results. In closing, this research was expected to be a focus for policy makers or related parties in determining future steps to see existing public sentiment towards Islamic finance and can be a special concern for the general public.

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